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For the Farmers' Register.

SUGGESTIONS FOR THE IMPROVEMENT AND PROFITABLE CULTURE OF POOR LAND.

To T. B. A. of CAROLINE.

Dear Sir—

The strongest sympathies are said to arise from community of suffering; if this be true, you and I should be friends. Your communication in the March No. of the Register, produced so much interest, that I commenced a letter to you soon after reading it. Being interrupted by business, it was lost while in an unfinished state. But the interest has been kept up, and *incog.* as you are, I still feel disposed to address you, although conscious that my letter will contain little worthy of notice, besides an expression of good feeling.

The detail of your situation so exactly depicted my own, except in small matters of time and locality, that some of my friends suspected me of writing it. I too am a *poor land* farmer, and follow a profession which requires that I keep horses not used in the plough—more of them, I fear, than I manage to render profitable. If, however, I were the owner of the richest lands, my feelings of regard would be called forth towards him, who might be striving to learn the means of fertilizing the extensive portions of our state, which are impoverished, and which have, as yet, defied efforts at improvement.

While I fully subscribe to nearly all the doctrines of the Editor of the Farmers' Register in relation to the constitution of soils, my first thoughts, on reading his remarks, and those of "Commentator" on your communication in the March No., were of Job's comforters. By this, I by no means intend disparagement on either of these gentlemen, my feelings of regard for the first of whom I would not attempt to express, in his own periodical; and the latter I suspect to be a gentleman, to whom (though personally unacquainted with him,) I have long felt that I owed much, both for his political and agricultural writings.

When the great question arises, "should all attempts to improve the lands in Virginia, naturally poor, and denied the benefit of calcareous manures, be relinquished?" too much is involved to treat it lightly, or to form hasty conclusions. Some of the finest specimens of population on earth may be found in various parts of Virginia, on lands "born poor." Perhaps the necessity for exertion, produced by this poverty of soil, has contributed to the improvement of their morals. I would not argue from this, that poverty of soil is always a blessing. But that, like many other evils in this world, it may be converted into the means of doing good, if connected with proper dispositions in those who have to contend with it. The same people, on the same soils, if they could discover any mode of more extensively improving them, would improve with them. But here is the difficulty. Can poor lands be improved without calcareous manures, on a scale sufficiently extensive to render them the abiding places of a thriving —a happy and virtuous people. Prove that this can be done, and it will be the most effectual mode of arresting the awful tide of emigration, going on from our beloved land. And if it cannot be done without calcareous manures, we should, with all possible despatch, construct rail roads to the most convenient points for obtaining them. "Don't give up the ship."

When I suggest some steps towards effecting an object so desirable, (however dogmatic, for the sake of brevity, may be my manner,) I beg you not to suspect me of the vanity of aiming to instruct my *incognito* friend, from whom I should be glad to learn. Through you, I address many, some of whom may meet a useful suggestion. But lest my suggestions should prove like the Frenchman's dinner, too short for the long grace preceding it, I will wave further introduction.

In attempting to improve our soils, we should never forget, that the great defect in their constitution, consists in a deficiency of calcareous matter; this should lead us—

1. To seek out, at all times, every available mode of supplying such matter.

2. To diffuse manures over our fields, according to their powers of retention, or their natural grade of fertility, recollecting that the redundant manure applied to any spot, beyond its power of retention, will be converted into gas, and escape as soon as complete decomposition occurs. This evaporation takes place also (though more slowly) in calcareous soils, rendering occasionally meliorating crops necessary, to prevent its injury. Our soils need greater attention to such crops, as from them evaporation is more rapid.

3. We should remember that a soil defective in calcareous matter, is, according to the degree of that defect, less adapted to the production of grain, and grasses producing granular seed, and the better suited to the growth of weeds. The truth of the first clause of this proposition is indisputable. Every kind of grain, and especially wheat, is produced in greater quantity and with greater certainty, on calcareous lands. The latter clause is equally clear to observation, and, possibly, very important inferences may be drawn from it. We find that fence corners, and other places so much infested with weeds in Eastern Virginia, are almost clear of them in the neutral soils of the Valley. No land yields more luxuriant tobacco than that covered with the heaviest coat of broom-straw, if properly manured. This weed grows also in its highest perfection, in some districts, which yield nothing else well, now cultivated. Chaptal, while treating of the cultivation of woad, (*Isatis Finctoria.*) a weed raised in France, from which indigo is extracted, observes—"The nature of the manure which is employed in the culture of woad exerts a powerful influence, not only upon the vegetation of the plant, but upon the quantity and quality of its coloring principle.

"The manures which consist of well decomposed animal and vegetable substances are the best, and for this reason, night soil, the dung of sheep and cows, the decayed fragments of wool and silk

and the chrysalides of the silk-worm are preferred to any other manures.

"Those substances that act as stimulants to vegetation, such as lime, plaster, marine salt, poudrette, mortar-rubbish, ashes, &c. favor the growth of the plant, *without affecting the coloring principle.*" *Chemistry applied to Agriculture, Boston Ed. pp.* 295, 296.

Calcareous manures having so recently attracted much attention in this country, our opportunities of making observations of this nature have been rare. It is, however, rather probable, that such manures, while they bring to earlier maturity, will not increase or improve the peculiar qualities of other plants, besides the different kinds of grain and most of the grasses. Further agricultural developements may deduce important results from the foregoing principles. Should we, who are almost excluded from the benefits of calcareous manures, ever cultivate largely the poppy, woad, the whole class of root crops, (which I think need but little lime,) and many other plants which may be found to thrive best in soils not calcareous, we may be almost equally indebted to those who have developed the principles connected with lime, as a manure, in its various forms, with those who possess such advantages in the highest degree.

Horizontal ploughing, hill-side ditching, manuring, and the cultivation of grasses, are the means on which I would mainly depend in attempting to improve our lands.

Having given some of my views in relation to levelling and manuring, in previous Nos. of the Register, they need not be repeated here. Some further remarks may, however, be made, on the preparation of manures. You would be surpriséd, sir, to find how much material for making manure you could amass in a short time, if proper preparation were previously made. This consists in furnishing every hand you can muster (except the drivers,) with a good sharp rake, and every pair of wheels on the land with a large, light body, for hauling leaves and other rubbish to be rotted in the farm-pen, or rather, farm-pens—for I would have several of them in convenient locations for hauling out the manure, after it is made. One of them should have in it a good cow-house, to shelter the cattle in bad weather. This may be made of corn tops, or otherwise, as suits you. Last winter, as bad as the weather was, I spread leaves on about seventy acres of land, with about fifteen hands, six horses—generally worked singly in carts—and seven oxen. The oxen were worked, one yoke at a time, to the same cart, so as to rest each other. The leaves for somewhat more than one-third of the field were previously prepared in the farm-pen. The rest of them were injudiciously spread on the land as they came from the woods. These last did but little good to the corn, as it got its growth before they began to rot much—June, and July (until the last of it) being, with me, very dry months. I think, however, that I have made fully double the corn that I could have made on the whole field, without manure.

I have been told that what are commonly called ground-slides, with pieces of iron eighteen inches long, bent into the segment of a circle, and nailed to the bottom of each runner, to bear the weight and prevent friction, serve better than horse-carts to haul leaves for short distances.

After getting all the litter possible into your pens, the next business is, to prepare it for yielding you the greatest and speediest profit. Besides the ordinary commixture with animal manure, the drainings from the pens should be caught in pits dug for the purpose, and sprinkled over the litter (with a large watering pot) as soon as it is dry enough to receive them. The dirty water and soap-suds made by washing clothes in the family, is also worth saving for this purpose. There are many other substances which might be profitably used in this way. The blood of animals slaughtered on the farm, if mixed with water, in the proportion of one part to twenty, might considerably enrich a bed of leaves or other litter. The filthy fluids of a kitchen, if deposited in a strong tub and borne off daily, constitute a good article for top-dressing, or for impregnating litter. Before heaping your beds of litter, which I think should be done once in two or three weeks, through the winter, sow on all the ashes you can procure. The quantity of this article will be greater than you would suppose, if you will supply every negro house with an old barrel, and see that they are periodically taken up and secured. You may do your neighbors a favor by purchasing at a very low price, such as they would otherwise throw away. Your example and success might teach them economy in the use of manures. It might be well to make your calculations, whether you could not profitably afford to buy lime in moderate quantities, and potash to sprinkle over your litter, before heaping. The latter should be dissolved in water and applied with a watering pot.

I know from experience that top-dressing on wheat, with both lime and ashes, at the rate of only four or five bushels to the acre, much improves the wheat, and secures the life and comparative vigor of the young clover, on poor land. Wheat, however, should not—as a general rule—be sown on poor land.

Success from manuring does not depend so much on the mere quantity of matter used, as upon a judicious mixture of all those substances entering into the composition of the crop to be raised on the land. And the fluids, &c. mentioned above, not only hasten the putrefaction of the litter, but furnish nutriment for the crop which it could not derive from the litter alone. It is on this principle, that a little rich compost will frequently cause a more abundant harvest than the greatest profusion of ordinary manure. It would be well for the farmer to make out a list of all the substances within his reach, which can be profitably used as manure, and to avail himself of them whenever an opportunity is presented.

In the prosecution of the foregoing plans, it is evident that the corn-field will be considerably diminished in size. This need not create concern, if the crop is increased. But in the commencement of such a system, requiring the whole corn field to be manured, we must calculate on rather small crops of corn—though they will, in some seasons, be much larger. The deficiency must be supplied by preparing for an abundance of suitable substitutes for corn. The chief reliance, for this purpose, should probably be placed on oats. The time usually occupied in tending three times the quantity of land in corn, as is here contemplated, to almost no purpose, might be employed in gathering materials for manure, in shrubbing out sassafras, persimmon, and other bushes, in turn-

ing under the running blackberry, and other smaller nuisances; and thus you might prepare, besides your small corn-field, an extensive fallow for oats, and (if you sow early enough,) make a large crop of this valuable grain. With a plenty of oats we may get along pretty comfortably, with but little more corn than enough for bread. As food for horses, barley has great reputation. In confirmation of this, the Arabian horses which get no other grain, may be cited. It is said to thrive best in a rich sandy soil, and an arid climate. With it, however, I have no experience. For feeding animals mangel wurtzel, Guinea grass, ruta baga turnips, and a variety of other articles, may profitably be prepared. Mangel wurtzel, or field-beet, grows most astonishingly in Virginia, wherever I have seen it tried. I have reared an amazing crop of it this year, on poor land, manured in the drill, after turning under a moderate coat of leaves from the woods. This crop should be harvested before the accession of hard weather, be put away dry, and well secured from frost.

Much effort is sometimes made to get the corn land broken up in the fall and winter. This is important in stiff soils, but if the land be light, and there is but little vegetable cover on it, I should prefer spending the time in the preparation of manure.

Those who have rich lands must judge for themselves, with regard to a rotation of crops. *We* must be guided by necessity. The best rule, perhaps, is to cultivate in corn no more than we can manure, and in small grain all the corn-field of the preceding year, and all that we can prepare with a clean nice fallow. You may begin to think about the most suitable rotation after getting over the arable part of your farm, with corn and manure, that is, after getting something fit to make a rotation on. But it may be said that "the rats will be crying" over the part you commenced on before you get through. To prevent this, besides catching as many of these rascals in traps as possible, and thus giving them something else to cry about; sow grasses on as much of your land as possible—clover on such as will grow it well, and on the poor land sow burnet, Peruvian grass, herds grass, or any other kinds which you can reasonably expect to grow.

The subject of grass has been strangely neglected in Virginia. No good northern or English farmer would think of leaving a field bare of grass, after cultivating a hoe crop. We know little, generally, of other grasses than clover, timothy, and herds grass—and much too little of them.

Clover will seldom grow on lands, naturally poor, and artificially exhausted, until after they have been manured. Hundreds of our citizens, since the publication of the Register and the Cultivator—not the readers of these works, however—have been purchasing clover seed with the vain hope of enriching their poor lands, by the instrumentality of clover and plaster. I believe, that—at least in the southern part of our state—there is but little land naturally poor, possessing such adaptation to be enriched by clover and plaster, as Columbia county, New York. I know, from expensive experiments too, that mine does not. I find that after improving it, these articles, if properly used, will keep it in good heart. But they will not do to start with. If the clover is desired to feed on, it should be sown on lots already enriched. It may be true, in some localities, that poor land can be enriched by clover and plaster. With me, the proposition is reversed. I can only grow clover, to advantage, on land already improved: and even then, the efficacy of plaster is very uncertain. By the way, I would thank him who would explain to me, why this article is so capricious in its action. I have taken much pains to procure pure gypsum, but have found it sometimes failing to show any benefit at all—at others, succeeding wonderfully: and some of the parcel which failed one year, succeeded remarkably the next. And all this, on lands very similar.

The following questions, in relation to the clover crop, merit consideration. 1. Is it generally best to cut the first crop, reserving only the fall crop to plough in; or should the whole year's product be turned under? 2. Should clover be turned under while unripe, or in the mature state?

1. If the land be strong enough to produce a crop sufficiently tall to be cut by the 20th of May, I should cut it, with the expectation that before winter, it would again produce as much vegetable matter as there is any necessity for turning under ground—and, believing the hay better when cut early, than after the seed are matured. Moreover, the general fertility of the tract cannot be diminished, if the hay be consumed on the farm, and the manure properly attended to. If, however, the spring be late, and the state of the land render the production of a plentiful fall crop doubtful, and it be important to keep up the fertility of the particular spot on which the clover grows, it might be best not to take the spring crop off the land. There is with us, but little ground strong enough to produce a copious second crop, unless it be started to growing, by a removal of the first, as early as about the 20th of May.

2. Most plants are thought to throw their most nutritious particles into their seed. The seed of clover, when turned under, lie as dormant—so far as the immediate improvement of the land is concerned—as so many grains of sand. The stalks and leaves then, being deprived of the nutriment which has gone into the seed, must yield less to the soil than if they had been ploughed in before this occurred. While there is honey in the blossom, I should judge to be the best time to plough under the crop. At this juncture, it may be supposed, that all the nutritious matters about to pass into the seed, are formed in the plants, and would be given to the soil, if properly ploughed in. These rules, I suppose, would be applicable to the cultivation of other grasses. It is believed, that our northern farmers are in the habit of turning under all grasses designed to meliorate the land before they come to maturity, and that in this, they have the advantage of us.

We are much in the habit of cultivating grasses, by way of mere *project*—and of course, we attend to them, only when our other business seems to afford leisure. This leisure rarely occurs, and the grasses are rarely attended to. Were we determined to convert the grasses into market crops, there would be much more hope of success. Hay sells well, in most parts of our state, at all times; and at the present prices of grass-seed, as much might doubtless be made by raising them for sale, as could be, from the same ground in wheat. If we would raise grass-seed successfully, we should prepare plots of ground nicely, for the special purpose. If reliance be placed on the large fields in-

tended for hay-making or grazing, for this purpose, it is very liable to be foiled. Clover-seed may, however, be gathered from large fields. These, I have been in the habit of gathering with a clover-comb, drawn by a horse—such as is described and represented by a plate in the first volume of the American Farmer. With this implement they may be gathered, in clean grounds, with more facility and rapidity than by any other mode known to me. My grounds have of late been infested by a species of stick-weed, bearing a small white blossom in autumn, which not only prevents the use of the implement, but, by overshadowing the clover, greatly diminishes the crop of seed.

I cannot close these hurried remarks, without pressing on your attention the value of the root-crops, more especially the mangel wurtzel, beet, and ruta baga turnip. Either of them may be raised in great quantities on ordinary corn land, if manured in the drills, and occasionally top-dressed through the season. This last labor may be performed by women and children. I pray you, try these crops. The first should be sown in April, the last, about the 25th of June. Ruta baga turnips have lost character, and been discarded by many, because they would not come to maturity when sown late. These may be raised to great advantage, if drilled between cabbages, strawberries, &c. in the garden, and slightly top-dressed. My beeves, milch cows, pigs, &c. are now enjoying these roots, and I am highly pleased with their effects. I mix and boil them with other kinds of food, which are not succulent. The improvement in the milk, in quantity and quality, since feeding on mangel wurtzel is very manifest, and the cows have fattened remarkably.

I have, now, sir, according to the best of my ability, and the little interrupted portions of leisure allowed me, given you some of my desultory, and of course, tedious views, on the improvement of land. I have not done this, from a vain belief that I was capable of being a teacher of agriculture; but because I felt the force of your strong call for attention to the subject of improving "poor land." While I consider most of the schemes for speedily and easily effecting such a purpose as entirely visionary, I do believe that with great labor, judiciously applied, poor lands may be profitably improved. Let any candid man go into the county of Fluvanna—somewhat proverbial for its poor land—and observe what fine crops of wheat and tobacco are raised—how well the people live, and what fine people many of them are—let him notice the tracks made by some of the patriotic citizens of that county, for many miles from their dwellings, in the way of improving roads, and other public-spirited efforts, and he could not find it in his heart to discourage their hopes of improving their "poor lands." Even if such regions cannot be made rich, they form much of the strength of our state—and had much better remain as they are, than be abandoned.

On parting, I tender you my best wishes, hoping to hear from you occasionally in the "Register."

"In ploughman phrase, "God send you speed,"
Still daily to grow wiser—
And may you better reck the *rede*
Than e'er did the adviser."

Yours,

M. N.

From the British Cyclopædia.

NATURAL HISTORY OF THE CHEESE MITE, OR JUMPER.

A small white fleshy grub of an elongated form, often found in decayed cheese, and which is the larva of a pretty two-winged fly, known by the systematic name of *Piophila casei*. Of this insect the immortal Swammerdam has left us an interesting account; and though to unthinking persons it may appear to be a frivolous subject of inquiry, we find the illustrious philosopher affirming "that the limbs and other parts of this worm are so uncommon and elegant, and contrived with so much art and design, that it is impossible not to acknowledge them the work of infinite power and wisdom, to which nothing is hid, nothing impossible." It has been a common error that these insects were bred spontaneously from the cheese, and epicures accordingly do not hesitate to eat them with great gout, thinking them formed from the very best of the cheese, whereas they are produced from eggs deposited therein by the parent fly. These larva are long, cylindrical, and composed of twelve rings, the first of which is furnished with two small bent hooks of a black color, which serve not only as teeth, but for feet also, the insect having no other organs employed as legs. The terminal segment of the body is covered with a variety of prominent tubercles and little cavities like wrinkles, of which we will presently see the use. When this larva prepares to leap, it first erects itself on its anus, in doing which it is greatly assisted by the prominent tubercles of the terminal ring, which enable it to maintain an equilibrium. It then bends itself into a circle, and having brought the head towards the tail, it stretches out the two hooks of the mouth, fixing them into the two cavities at the extremity of the body. It then contracts the body from a circular to an oblong figure, the contraction extending in a manner to every part of the body. It now suddenly, and with great violence lets go its hold, and the elastic force of the body returning to its natural position, produces a leap to a considerable height and distance, at least twenty-four times greater than the length of its own body. Here we cannot but admire the powers given by nature to different creatures, and their limitations, to answer different purposes, and not for mischief to mankind. If, for instance, a power of motion, proportionably equal to that possessed by this insect, had been given to the serpent tribes, how much more terrible would they not have been rendered, than with their present capabilities? A viper would throw itself nearly a hundred feet upon the traveller, and the rattle-snake several hundred.

Swammerdam, after giving a minute account of the external and internal anatomy of this creature, observes, "now let the sharpest geniuses, and men of the greatest penetration and learning, judge if a creature, on the fabric of which there plainly appears so much art, order, contrivance, and wisdom, nay, in which is seen the hand itself of the omnipotent God, could possibly be the production of chance or rottenness?" The female fly is provided at the extremity of the body with a very fine retractile borer or ovipositer, wherewith she pierces the cheese and at the same time deposites her eggs in the wound thus made. Shortly

afterwards the grubs are hatched, and feeding upon the cheese cause it to decay: the fine powder which we perceive, and which is so highly prized by the gourmand, being nothing else but the excrement of these grubs, which, when they have attained their full size, desert the cheese, and in three or four days they loose all motion, grow stiff, become hard, and contract their bodies into an oval mass not more than half their previous length, within which the real pupa is inclosed; this insect undergoing the coarctate kind of metamorphosis, like the majority of two-winged insects. After remaining some time in this state, the chrysalis becomes of a black color, and the enclosed nymph breaks that part of the outer covering which defends its head into two parts, and at the same time throws off from every part of the body a thin and slight membrane which it leaves within the old case. At first the wings are scarcely perceivable, the insect however, runs abroad very quickly, and shortly afterwards the wings are by degrees extended into full length, when the insect is fitted for pursuing its duties, which almost entirely consist in the reproduction of the species. The fly is about the size of the grub, of a shining blackish green color, the wings transparent and shining, and the legs varied with ochreous and black.

From the last London edition of the "Complete Grazier."

ON THE BREEDING, REARING, AND FATTENING OF SHEEP.

On the management of British wool.

[Concluded from p. 523 Vol. III.]

In describing the fleeces of this country, Mr. Luccock disposes them in two classes—the *combing*, and the *carding* wool—which are mutually distinguished by the length of the staple and the mode of manufacturing them; the one being suited to the fabrication of worsteds, and the other to the making of woollen goods. The sheep from which these different kinds of staple are obtained, do not run promiscuously in the same flock, or graze upon the same pastures; each being most commonly found upon its appropriated soil, and under a peculiar management. The line which generally separates them is boldly drawn; though in some few instances the pastures are so mingled, or the qualities of the land so gradually change from those which are suitable to the heavier sheep, as to give the stock a sort of mongrel appearance, and the fleece an uncertain character. But human genius, always fertile in expedients, has rendered even this defect of the fleece advantageous to the interest of society; and has adapted to it the manufacture of stockings.

Thus, although long wool is found in many detached parts of England, it is much more common on the eastern than on the western side, and often nearer to the coast than the middle of the kingdom. Sometimes it is produced upon a few acres which are surrounded by land of a different description, and grazed by sheep of another character; these tracts, being too small to deserve general attention, will be passed unnoticed, and the wool included in the common produce of the district where it grows. Among the larger ranges of long-woolled sheep, the first to be noticed, and the most northern, is situated near the mouth of the Tees, a river separating the bishopric of Durham from the county of York. The second, which may properly be denominated the Lincoln district, comprehends the south-eastern point of Yorkshire, nearly the whole of Lincolnshire, and the fen lands of Huntingdon, Cambridge, and Norfolk. This kind of wool is found in the smaller marshes of Essex and Kent which surround the inlets of the sea, but is much more abundant in those of Romney and of Pevensey. We meet with it in the counties of Dorset, Devon, and Cornwall, upon the Cotswold-hills, in some detached parts of Lancashire, Oxford, Bedford, and Stafford, through the whole of Leicester, Rutland, Northampton, and Huntingdon, and long the banks of the larger rivers.

But it is remarked by Mr. Luccock, that the short wools of the kingdom do not arrange themselves so distinctly in districts as those of a longer staple do, but fill up the whole space besides that which has been noticed as the pasture of the heavier breeds of sheep. Those families which produce a fleece suitable to the card, though originally possessing features much more strongly characteristic than are found in the other kind, are sometimes so mingled with each other, and with the sheep of the larger fleece, as to render it difficult to determine what particular race many of the individuals belong to. Yet it will be found most convenient to describe them in classes, and to proceed from that county where the species appears most pure, to those where its blood becomes intimately mingled with that of another variety. We know not the period when any of these sheep were introduced into the country, nor whence they were procured, but there remain at present in England and Wales, six different kinds of them, viz. the Norfolk, the South Down, the Wiltshire, the Ryeland, the Heath sheep, and the Mountaineer; besides some small collections of different varieties, which seem to have descended from families now almost extinct.*

Only two modes, says Mr. Luccock, have yet been adopted for the improvement of fleeces. "One consists in selecting those lambs for slaughter which have the least valuable coat; the other in bringing into the flock male sheep of the most approved breeds, in order that their progeny may perpetuate their best peculiarities."† It is in fact by the judicious crossing of different breeds with Spanish sheep, that so much has been done towards the amelioration of British wool, and, since this subject has been very ably treated by a neighboring practical writer,‡ we have selected the following important principles, founded on actual experience, for the consideration of all wool growers. They refer, indeed, solely to the improvement of short, or carding wool; but the judicious breeder will readily perceive that they may be equally applied to long-woolled sheep; and a consideration of the facts already recorded must evince the strong probability, that the latter breed will henceforward command superior attention.

1. Every person, who is desirous of having a

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* Treatise on wool, p. 137.

† Ibid. p. 350.

‡ Mr. Fink's Treatise on the "rearing of sheep in Germany, and the improvement of coarse wool," published (in German) at Halle, 1799.

fine-woolled flock, must select the finest rams that can possibly be obtained, particularly at the commencement of his undertaking, i. e. for the first generation; for, if the ram for the second race is finer than that employed for the first, it is evident that time has been lost in effecting the proposed improvement.

2. In like manner, the finer woolled the ewe is with which the improvement commences, so much the more rapidly will that of the breed arrive at the degree of superfine.

3. The greatest attention is requisite that the rams employed for the subsequent breeds be as fine as the first; otherwise the amelioration will be retarded.

4. Where a breeder is desirous of stopping at a certain degree of fineness, without proceeding any further, he may easily effect this object. It will in such case be sufficient to take a ram and ewe of the first or second race; he will have one-half or three-fourths fine; and his flock will retain this degree of fineness without any additional improvement.

5. Unless the breeder be minutely attentive to the selection of his rams, the produce of the cross will have only one-fourth part of the Spanish fineness.

6. If an unimproved ewe be put to a ram of a mixed breed, and which has only one-fourth part Spanish in him, the offspring will only have one-eighth Spanish: by continuing to propagate in this manner, a complete separation of the two breeds will at length be effected.

But Mr. Luccock is of opinion, that flocks might be amended much more rapidly, if, in addition to the common methods above detailed, a kind of barter in lambs were adopted between two neighboring districts, one of them possessing a superior, and the other an inferior breed of sheep. If these could be exchanged in such a manner that the inferior sorts only should be sent to the markets, while the good ones were preserved, he affirms that the British flocks would annually become more valuable; as a few seasons would be fully sufficient to dispossess the least cultivated breeds of their present pastures. Our limits do not allow us to notice the objections which he conjectures may be made to this proposal; but, as it is evidently the result of much reflection and experience, we leave it to the consideration of the attentive reader.

Mr. Bakewell, however, has brought forward some facts and observations which render it probable that the fineness of wool depends upon the *difference of soil.** Having, early on his introduction into the wool business, noticed a remarkable difference in the softness of wool equally fine, but which was produced in different districts, Mr. B. was led to believe "that the herbage of each district derived from the difference of soil some peculiar properties, which gave to it, as the food of sheep, the power of effecting that process of the animal economy by which wool is produced."

"The soils most favorable to this soft quality were, first, the argillaceous; next the siliceous; and it was well known, that calcareous soils, whether limestone or chalk, produce wools of a contrary quality, remarkable for their harshness to the touch. In proportion as the above earths preponderate in a loose state near the surface of different soils, their effects may be detected, whatever be the breed of sheep from which the wool be shorn."*

These remarks on the effects of chalk upon wool, are limited to chalk alone, by Lord Somerville, who considers them as inapplicable to limestone soils in general. "Lime," his lordship observes, "certainly may be burnt from chalk as well as from limestone: as chalk it is conveyed into the fleece by contact in its natural state; but limestone, if it does not lie deep below the surface, as is usually the case, is a hard and clean stone, and can communicate nothing to the wool until it is rendered into lime by the strongest effect of fire. This doctrine militates also against the whole of our practice in the western counties. The pile of all my Merino wool, even of the pure blood, is publicly admitted to be improved; it has been constantly grown on a limestone soil, and the surface of the land manured with lime on each course of cropping, and to the extent of 100 bushels per acre of the best popple-lime, the quality of which has been ascertained by Sir Humphrey Davy, to whom specimens were sent; it has been treated on in his public lectures, and its quality ranks among the strongest of our manuring lime. As the author speaks so positively on the effect of limestone on wools, we may conclude that the limestone of Derbyshire and the adjoining counties does produce this effect."

Mr. Bakewell conceives that the *soft quality* of wool may be preserved in every situation by *greasing the sheep;* and that the same means will also contribute to counteract the effects of climate and soil, where these are unfavorable to this quality; and further, that sheep will thereby be preserved from cutaneous distempers, from the change of climate, and from the sudden change of temperature after shearing. Mr. B. strenuously advocates the practice of greasing sheep, proving its antiquity as well as its usefulness by details of facts, for which we reluctantly refer to his work, as this article would otherwise be extended beyond our confined limits. The result of his practice, however, may be comprised in the following positions, distinct from the recital of facts by which they are supported. Mr. B. infers,

1st. That hair differs from wool, by the greater degree of hardness and elasticity of its fibres.

2d. That some wools resemble hair in this quality more than other wools which are much coarser.

3d. That the hard quality found in some wool, prevents it from making cloth of the same value as the softer wools, if the former are considerably finer than the latter.

4th. That the application of unctuous matter sufficiently soft and tenacious to cover and remain upon the fleece, will defend it from the action of the soil, and is found to produce the soft quality of wool, so desirable to the manufacturer.

Hence the greased wools of Northumberland and Yorkshire possess a superior degree of softness to any ungreased wools in the kingdom.

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* "*Observations on the influence of soil and climate upon wool*," &c. 8vo. 1808. The value of this work is considerably augmented by several important notes communicated to the author by the Rt. Hon. Lord Somerville.

* Bakewell on wool, p. 5.

Sheep that have received the benefit of this practice, and are driven into other counties not remarkable for soft wools, still preserve the distinguishing softness of their fleece. Thus also we learn the reason why ointments, when casually employed to cure some disease of the animal, have also generally been found beneficial to the wool.

If these facts and inferences be admitted, we may also infer, that an improved method of greasing fine-woolled sheep should be adopted in every part of the kingdom, and that it would greatly improve the quality of the wool, and annually save many thousand sheep from perishing by the severity of the weather.*

It has been recommended to besmear the roots of the wool, immediately after the sheep are shorn, with an ointment composed of butter and sulphur, which is to remain on the sheep for three or four days; at the end of which time they are to be washed in salt and water. The advantages stated to result from this practice are—a considerable improvement in the softness and fineness of the quality and also an increase in the quantity of wool produced; besides which the unguent operates as a coat to the animals, and thus prevents them from taking cold immediately after shearing; and also destroys the insects with which they are sometimes infested: a simple washing over with tobacco water will, however, answer the latter purpose.

Too free a use of greasy substances occasions the fleece to imbibe dirt; and although they may not injure the quality of the wool, yet the difficulty of cleansing it materially lessens its price. The opinion that it is of advantage to the growth of the wool may not be incorrect; but it is deteriorated, in a greater proportion than its increased weight, in the eye of the wool-stapler, in consequence of the additional waste and trouble thus occasioned in preparing it for the manufacturer.† Were these objections removed by a proper system of thorough cleansing, and by the use of substances less noxious than fish-oil, tar, and turpentine, it is, however, not improbable that much benefit might be obtained by carefully greasing the pelt after shearing, both in immediate protection from the fly, and in the ultimate improvement of the fleece.

From *British Husbandry.*

ON PUTRESCENT MANURES.

[Continued from p. 564, Vol. III.]

Yards and Sheds.

We have already said nearly all that appears to us to be necessary on the *management of yards*, and the *construction of sheds* for the preservation of manure, in our remarks upon farm buildings,‡ though it may be observed that the former are often so full of large holes as to leave them in many parts saturated with water, or their bottoms are either so porous, or else situated on such declivities as to drain off the entire moisture; in either of which cases the loss cannot but be very considerable to the farmer, although he may be ignorant of what he is daily losing, because it does not go out of his pocket in the shape of hard cash. Whenever a yard is circumstanced in either of the ways just mentioned, all the inequalities should be levelled, the bottom should be rendered sound and water-tight, and if either any declivity in the yard, or the situation of the buildings, occasions the stock confined in it to give a preference to one part over another, the litter should, in that case, be occasionally removed, in order that it may be equally spread over every part, and the position of the feeding-cribs should be altered; for although our opinion inclines to that form which prefers a gentle slope to the centre of the yard, and the dung should be kept moist, it yet should not be suffered to become drenched with rain. If this be not attended to, the excess of wet will prevent the bottom of the heap from rotting; and if it be not regularly spread to a nearly equal depth, the fermentation will be carried on imperfectly, which will occasion those parts where it may have been too much raised to contract an excess of heat, from which they become what is termed *fire-fanged.* This especially applies to stable-dung, which, if allowed to accumulate in heaps without being properly mixed, acquires a mouldy smell, and loses so considerable a portion of the best part of its substance, that its diminution in value has been estimated by a very experienced agriculturist at not less than from 50 to 75 per cent.*

Acting upon the principle of preserving dung, and rendering it immediately available, it has been recommended to construct cattle-sheds, sufficiently capacious to allow a space rather broader than the platform upon which the beasts lie, but sunk somewhat lower, and to which the dung may be swept up. When thus covered, its decomposition is effected by the aid of its natural humidity, and if left for three or four weeks, its fermentation will be completed. The time at which it is subject to the greatest evaporation of its volatile particles will then be past, and it may be immediately carried upon the land. Its quantity will be certainly less decreased, and its quality better preserved, by being left under the cover of a shed, and there will also be a saving of labor in its removal; but not alone should the neatness and order of stalls be taken into consideration, but also the cost. Theoretic people, when advocating new schemes in husbandry, rarely give themselves the trouble of calculating any thing beyond their effects upon crops, without due regard to the expense of their cultivation; and if in this case the additional charges of the erection of the building, together with the repairs, rendered necessary by the steam arising from the dung, were to be reckoned, they would probably be found to exceed the value of the proposed advantages of the plan. While the opinions of practical men on this and other modes of management are so unsettled and discordant, those cannot be deemed imprudent who adopt that side of the question which is the most

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* Bakewell on wool, p. 63.

† See the evidence of Mr. Thomas Cook, of Dewsbury, before the Committee of the House of Lords on the wool trade, in 1828, and the table of comparative prices exhibited by him; from which it appears that Highland laid, or tarred wool, is twenty per cent. less in value than when it is left in its native state.

‡ See pp. 95, 169, and 200.

* Blaikie on Farm yard Manure, edit. 1828, p. 5.

consistent with economy. We will, however, admit that it would be an improvement if reservoirs for the drainage of yards were so constructed that their contents might be pumped up, and sprinkled over horse-litter, whenever its too great dryness occasions any danger of its becoming fire-fanged; for, whether in the yard, or carried out to the dung heap, it should never be allowed to become so dry as to lose the power of fermentation, and if there should be no portion of it sufficiently moist to allow of the dry part being mixed up with it, so as to prevent that risk, it should be sprinkled regularly when shook up. A watering-pot with a large rose will be found to answer the purpose.*

There can, indeed, be nothing more appropriate to the subject than the observation of Sir Humphry Davy, 'that when dung is to be preserved for any time, the *site of the dunghill* is of great importance. In order to have it defended from the sun, it should be laid under a shed, or on the north side of a wall. To make a complete dunghill repository, the floor should be paved with flat stones, a little inclination being made from each side towards the centre: in the centre there should be drains connected with a small well, furnished with a pump, by which any fluid matter may be collected for the use of the land; for it too often happens that the drainings of the dunghill are entirely wasted.'† A sheltered spot of ground ought always to be chosen for the site; and although some after trouble may be saved by depositing it, in the first instance, in the field to which it is to be applied, it is yet, in most cases, found more convenient to place it in some secluded situation near the homestead. 'There it is always under the farmer's eye, and a greater quantity can be moved in a shorter time than when its position is more distant. Besides, in wet weather the roads are not only cut up by driving to a distance, but the field on which it is made may be poached and considerably injured.'‡

These are conveniences, however, that the great bulk of farmers cannot always command; and it often happens that it is necessary to employ the men and cattle in carting the manure to distant parts of the farm some time before it can be spread upon the land. Besides which, it must be admitted to be of much importance, when the turnips are sown, to have the manure ready in the field, as it is then covered in with the least exposure to a burning sun, and the moisture is preserved for the benefit of the crop. In the East Riding of Yorkshire, under 'Farming at Scoresby,' Mr. Howard observes,§ 'as soon as the farm yard is emptied, a quantity of light soil, or road-scrapings, is brought into it; all irregularities of surface are then levelled, and the yard is formed into the shape of a very shallow saucer, being the deepest in the centre. This is immediately covered with litter, and made the general receptacle for potato-tops and waste of every kind that is readily convertible into manure. The manure from the doors of the cattle-houses around it is also occasionally thrown into the middle of the yard, that all may be duly mixed. When carted out it is placed on a layer of earth, and banked up in a compact form, to exclude, as much as possible, both sun and air, and then covered lightly over with another layer of earth on the top. By this means none of its virtues are lost, and the top and bottom soil will mix with, and nearly equal in value, the rest of the heap.' This, indeed, is the common practice of all intelligent farmers, and it is evident that, by constantly putting a coat of light soil into the farm yard when emptied, a considerable addition will be made to the annual stock of manure, as a great part of this will have become saturated with the urine, and will be shovelled up with it whenever it is emptied.

Should there be no perfect and permanent site formed for a complete dunghill repository, accompanied by a well and pump, as above recommended, yet the space intended for the reception of any common dung heap should be slightly hollowed out, leaving one side rather deeper than the other, and cutting a narrow drain through that side, from which any superfluous moisture may be carried off to a yet lower excavation, where it may be received upon a bed of loose mould, or among articles of slow decay, as cabbage-stalks, the tough haulm of over-ripe beans, or any similar substances. It should also be surrounded with a mound dug out from the hollowed place, to prevent water from running into it, and, if that be prevented, no danger need be apprehended from any excess of moisture, except in times of very heavy rain, which, in such seasons, can also be much guarded against by sloping the sides. Were roofs constructed over dung-hills, to protect them from the rays of the sun, as well as from rain, there can be no doubt that, if roughly put up, at little cost, they would prove advantageous; but the benefit should be always closely estimated, in order that it may not exceed the charge: perhaps a contrivance of the kind might be made with spare branches of trees, and worn out hurdles, supported by posts formed out of any otherwise useless timber.

Preservation of dung.

Practice differs in the modes adopted respecting the *care of farm yard dung*. Most farmers allow it to accumulate for a long time in the yard, adding fresh straw regularly to the heap, from an impression that the bottom, if unremoved, will become the richest part, and that its accumulation imparts a certain degree of warmth to the cattle; while some recommend 'that it should be cleaned out once a month at least, not only to sweeten the yard, and thereby to increase the health and vigor of the animals, but in order that its contents may be properly mixed in some other place, to induce and bring on a regular fermentation.'* Now, on this it may be observed, that the fears which are entertained by some persons of the vapor arising from dung which is contained in the open air of the yards becoming prejudicial to the health of the cattle are proved by experience to be completely

* General Report of Scotland, vol. ii. p. 523.

† Elements of Agricultural Chemistry, lect. vi.

‡ Brown, of Markle, on Agriculture, vol. i. p. 372.

§ Report of Select Farms, No. 5, p. 27. See also Middleton's Survey of Middlesex, second edition, p. 377.

* Malcolm's Modern Husbandry and Survey of Surrey, &c. vol. ii. p. 8.

visionary. No really bad odor prevails there; for, although it may be offensive to delicate nostrils, the air is always respirable, and when not confined in close stalls, by which the circulation is prevented, no ill effects are ever known to arise from it. But when the cattle are either fed upon turnips or other green food, the quantity of urine which they discharge drenches such a quantity of straw, that the beasts cannot be easily kept dry; or if they be crowded in badly-arranged yards, and immersed in the filth proceeding from a scanty covering of straw, and the want of proper drains to carry off the superfluous moisture, they may then indeed be exposed to injury from the wet, and the dung should be removed, though in almost any case 'once a month' would be found too often. In many instances the yards are never cleared until the cattle are turned out after the close of the winter; and, unless in a very plentiful season for straw, it is seldom done more frequently, after they are shut up, than perhaps once more in the early part of the spring: except they be soiled during the summer, in which case it becomes frequently necessary. When proper care has been used to prevent an excess of rain-water, the manure thus obtained from the bottom layer will doubtless be found of superior quality; but the whole heap ought to be well mixed, in order to render it of equal value.

An eminent agricultural author, whom we have already quoted, complains that he has not, in any one instance, been able to find anything like system in the mechanical arrangement of the component parts of farm-yard mixens, which he generally found put together as they arise, according to circumstances, and without any regard to rule. Hence it follows that their real value as manure can never be distinctly known to the farmer, nor can he apply that proportion which a more accurate knowledge of the contents would enable him to apportion to different kinds of grain, or to the particular soils and seasons in which they can be most advantageously applied. A heap, for instance, composed entirely of dung from stables where horses have been plentifully fed with corn, must be far superior to one produced by cattle in the straw-yard; yet so little is this very material point adverted to, that nothing is more common than to hear of 'so many loads per acre' being laid upon the land, without regard to the ingredients which it contains, though nothing is more certain than that its power over the crops will be in exact proportion to the qualities of the materials of which it is composed.*

This writer advocates the separation of the various species of manure, in order that the properties of each may be distinctly ascertained; yet another author, of equal experience, says, in treating of Norfolk, 'that the principal error in the common method of manufacturing farm-yard dung originates in the prevailing custom of keeping the dung arising from different descriptions of animals in separate heaps or departments, and applying the same to the land without intermixture, and consequently in an improper state.' He then alludes to the difference arising in the manure from the modes of keeping fatting and store cattle in yards by themselves, 'while horse-dung is also usually thrown out at the stable-doors, and there accumulates in large heaps, which very soon ferment and heat to excess;' he therefore recommends that litter be spread over the straw-yard, and the whole of the dung from the different yards and the hogstyes to be mixed together.*

On these opposite opinions we have to remark, that, when either the soil or the intended crop is essentially different, it may be very desirable that the manure to be employed should possess distinct properties, and therefore, in such cases, a portion of it should be separately kept, as well as differently prepared. Thus warm and cold soils require manures of a contrary nature; an advanced stage of their fermentation is in some cases less favorable to vegetation than in others; and, in the instance of potatoes, it is well known that stable-dung is employed with more effect alone than when mixed. It may, therefore, be advisable that horse-litter in particular should be separately kept in the yards, not merely for the purpose just mentioned, but that, as being of a hotter nature than any commom dung, it may be mixed with that of other cattle in such proportions as may be thought best adapted to the purposes for which the compost may be required. If no better arrangement can be made, the litter should be placed within some dry ditch, which will answer the purpose of a more regularly constructed pit, where its moisture may be maintained without too greatly heating it, and without exposing it to the evaporating action of the air. Thus, if care be at the same time taken to prevent it from becoming dry, the fermentation will be checked; and should it be thought expedient to still further retard that operation, it may be effected by a mixture of hog's dung, which, though rich, yet being of a colder nature, is less fermentable. By this union the dung becomes decomposed into a soft and pulpy mass, which forms a very powerful manure, and, by a little judicious management, can be either promptly got ready or be kept back at pleasure.

Under other circumstances, however, and especially on small farms, where the quantity of materials may not be sufficient to allow of their being separated without incurring the risk of loss by the excess of evaporation, or by the want of due fermentation, it is found more generally expedient to spread together all the different sorts of the dung of the larger animals in different layers, so that each may be regularly mixed and partake equally of the common properties of all, by which means the faults of one species are corrected by another; the too rapid fermentation of the dung of horses is checked, while that of hogs and horned cattle is accelerated, and thus the whole mass acquires the enriching properties of the most fertilizing compost.

Preparation of manure.

Dung, thus indiscriminately thrown together, being composed of every species, whether from horses, pigs, or black cattle, bedded with a little of straw and haulm, to which every vegetable substance that can be collected round the house and premises should be added, forms a combination of fermentable matter of various kinds, which, with

* Malcolm's Modern Husbandry and Survey of Surrey, &c., vol. ii. p. 3.

* Blaikie on Farm-yard Dung, edit. 1823, pp. 3, 5, 6. See also the Nottinghamshire Report, p. 168.

due care, may soon be brought into a fit state of preparation. Instead, however, of laying it in a regular manner, it is too often suffered to remain in different heaps, in whatever part of the yard it may have been carried from the barn and stables, in which condition it is left during the winter; and being thus imperfectly fermented, its value is, in all such instances, very materially injured: whereas, if spread as equally as possible over the entire yard, the different materials becoming thus well mixed together, their different properties are blended, and a compact mass of manure is produced of equal quality.

It should, however, be observed, that there is in every farm-yard a proportion of hot and pungent dung, produced by poultry and pigeons, which should be separately kept for top-dressings, for which purpose it may be found very useful: if scattered over the common heap, it will, however, have the effect of increasing the fermentation and hastening its decomposition. That of swine, also, when thus mixed, has the same effect; and it was proved, after repeated trials, when the temperature of the air was 40° of Fahrenheit's thermometer, that of

Common farm-yard dung was about -	70°
A compost of lime, dung, and earth -	55°
And a portion of swine and fowl's dung	85°*

Care should also be taken that, if any other substances than those commonly employed be added to the heap, they be of such a nature as will render them equally susceptible of decomposition; if not, a small quantity of quicklime will have that effect; but it should be applied separately. Lime should also be added to all weeds which have ripened their seeds, as well as to the roots of docks and other noxious plants, which long retain the power of vegetation, and spring up when laid upon the land, unless they are destroyed. The better way, indeed, is to place them in a spot away from the yard, and mix them into a compost, as will be hereafter mentioned.

On what has been said respecting the *removal of dung and litter from the farm-yard*, it should also be remarked, that there being retained during a long time in the yard is consistent with the comfort of the cattle and the due preparation of the manure; for if straw be added in sufficient quantity to keep the former dry, although the lower layers of the manure may be in a good state, yet those at the top cannot. Straw, flung out to the yards in considerable portions, becomes, after being compressed by the trampling of cattle, rather like a well-packed stack than a mass of dung in a good preparatory state. Except where a considerable stock is soiled, the small quantity of urine and dung made by the animals is barely sufficient to cause a slight fermentation in the heap, which brings on fire-fanging after which its original powers can rarely be restored. To prevent that injury, no measure can be so successfully used as a frequent removal of this unmade dung, especially if the weather be wet at the time; for there is in such cases so much straw that has not passed through the entrails of the cattle, as renders it almost impossible to do injury by an excess of moisture:† if, therefore, its removal be deferred to any distant period, a proportionately greater length of time must necessarily be devoted to its turning and being got in order for the field. Unless over-year muck be used, if the manure be required for turnips, it will be found necessary to lead it from the farm-yard as soon after Christmas as the weather and the state of the roads will admit of it; or, if wanted for beans, that should be done much earlier. No period is more advantageous for this work than a frost; and if much manure is wanted early, it may be led from the yard a second time in the month of February. It should not be forgotten that the lighter it is laid upon the heap, the more rapid will be the decomposition; and that it may be retarded by compactness of form, and pressure on the top with a heavy coat of soil. This, however, must depend upon the quantity of litter and of cattle, of the extent of the yards, the state of the weather, the condition of the manure, and the intention to which it is to be applied—all varying according to circumstances, for which no precise rule can be laid down, and which must therefore be left to the judgement of the farmer. Yard dung, made in winter, if trodden by cattle, will not be found to ferment much. It ought, if possible, to be kept neither too wet nor too dry; if in the former state, it will injure the stock, without forwarding its own decomposition; and if in the latter, it will become mouldy, or fire-fanged, and lose its most valuable qualities: in order to prepare it in the best manner, it should therefore be preserved in a mean between the two extremes.*

Throughout most countries the general plan is, after foddering is over, to carry out the dung from the farm-yard, and to place it in large heaps, in order to occasion a due fermentation, and to render it quite rotten before it is laid upon the land. There are, however, many circumstances which render practice and opinion at variance on this point, in consequence of which a great portion of the manure is carried directly to the fields, and applied to the intended crop, either fresh, or perhaps after being once turned over. The apprehension that dung loses much of its virtue by evaporation is not entirely unknown or unattended to; but people think differently on the subject. Several farmers maintain that ploughing in the manure as soon as it is laid upon the land is unnecessary, if not injurious; because they say that it absorbs the nightly dews and other substances from the atmosphere, by which its quality is improved; that the rain will wash in the salts, while the sun only exhales the water; that, when spread upon the surface, the soil also thus becomes gradually impregnated with its juices; and that clay land in particular is rendered mellow and free to plough. Thus with many it is the practice to carry out yard-dung in its long and hot state, and to suffer it to lie both upon arable and grass land for perhaps a month or six weeks after being spread, before it is ploughed in, though it is acknowledged to encourage the growth of twitch and other weeds.† Others cover it, or, as it is termed in Norfolk, 'scale it in,' with a slight coat of mould. On the other hand, although the process of fermentation by disengaging a quantity of carbonic acid and ammonia,

* Farmer's Magazine, vol. xiv. p. 160.

†Brown, of Markle, on Agriculture, vol. i. p. 375.

* East Lothian Report, p. 158.

† Buckinghamshire Report, p. 273; Norfolk do., p. 174.

causes an evaporation, by which the bulk of the manure is much diminished, yet its power is thought to be thus increased. This apparent diminution in bulk has indeed been too much insisted on by the opponents of rotten dung, as proof of its decrease in value; for, although the size of the heap thus evidently becomes smaller, yet its cubical contents are, by its condensation, increased in weight.* After about six weeks it assumes a saponaceous, greasy appearance, in which soft and sappy state, when neither fresh nor too rotten, but in the medium between those states, it is generally applied to the land by the best farmers. When very rotten, its effect is more immediate and powerful; but when only moderately rotted, its effect, though more gradual, is found to be more durable.

On this *subject of evaporation*, which has justly engaged so much of the attention of scientific agriculturists, we, however, add the following extracts from the work of Von Thaër, whose practical knowledge cannot be too highly appreciated. He says, that not only does theory teach us, but during his own experience he has had frequent occasion to observe, that it is hurtful to remove farm-yard manure while it is in a high degree of fermentation; for, according to all appearance, an essential portion of the most active substances of which it is composed are evaporated when exposed to the air while that process is going on. But, before the fermentation has arrived at its height, or after it has passed, the dung does not seem to lose anything by exposure to the air; or, at least, nothing but what it regains by some other means.

That an evident advantage attends the spreading of fresh strawy dung upon the surface of the soil during the winter, and leaving it there in that state until the spring ploughing (it being, at the same time, well understood that no declivity of the land allows of its being washed away by the rain)—for this method of covering the ground occasions it to absorb the juices of the dung, and thus renders it not only friable to work, but extremely productive: so much so, that the straw has been afterwards raked off the land at the close of the season, and yet the soil has appeared as much improved, as that in which the whole of the litter had been buried—an effect which is also apparent in meadow ground which has been similarly treated. Not alone has this occurred in many such instances; but in others, in which both long and short dung have been spread upon land already sown with tares and peas, and though left there during vegetation, have produced the most beneficial effect upon the crops, especially when sown late, and applied to ordinary land of a light and warm nature; but what appears more extraordinary, and difficult to explain—the land which has been thus managed has evinced a decided superiority in the subsequent crops over ground on which even a larger quantity of dung had been regularly ploughed in.

That, as one proof of this, in the spring of 1808, rape was sown along with clover upon a poor soil, and was afterwards covered with fresh dung: in the autumn of 1809, the clover-ley was broken up, and rye was sown; the crop of which in the following year was distinguished by its superiority over that of an adjoining field which had been dunged upon a summer fallow. Indeed, after a number of comparative experiments, made by himself as well as by other farmers, it appeared to him beyond all question—however incredible it may seem to those who have not also tried its effects—that dung which has already passed the extreme point of fermentation, not only loses nothing by being exposed upon the land, even during the summer, but even gains. The evaporation may, indeed, be not so great as it is generally supposed; for although it is true, that when the dung is carted out and spread, it then effects the air with a strong musky smell, yet there is no mode of avoiding that; and even if there were, the vapor which is thus diffused is so tenuous, light, and expansive, that doubts may be entertained whether the quantity of sap which is thus evaporated can be very considerable, as, after a short period, the dung does not exhale any odor. According to the experience of M. Thaër, it does not lose in weight; and he remarks, that, if laid during a few weeks upon a summer fallow, a number of young plants of a very vivid green will be seen to spring up, even upon spots which have not come into contact with the dung; which proves that its fertilizing properties were spread around, even before it had been buried in the soil.*

We have thus entered at large into this discussion, because we consider it important to throw every light upon the subject of which it may be susceptible; and it besides contains some strong reasons for the application of long dung.

There are, however, many farmers who persist in the use of *over-year muck*, or that which has been kept perhaps a twelvemonth, or more, until it is completely reduced to a palp, in which state it is very commonly applied to turnips. It thus loses

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*The weights of putrescent manures will depend much upon the progress of their decomposition at the time, as well as the proportion of moisture which, from accident or particular treatment, they may contain. From an experiment on the subject, recorded in the Farmer's Magazine, we learn that the comparative weight of the following substances was as follows:—

	cwt.	qr.	lbs.
One cubical yard of garden-mould	19	3	25
Ditto of water	15	0	7
Ditto of a compost of earth, weeds, lime, and dung, that had lain nine months, and been turned over	14	0	5
Ditto of new dung	9	3	18
Ditto of leaves and sea-weeds	9	0	7

Thus a cubic yard of water is to that of new dung nearly as 3 to 2.—vol. xiv. p. 162. Von Thaër calculates the weight of a cubic foot of any strawy farm-yard manure at only about 46 lbs.; while one which has been partly decomposed will weigh from 56 to upwards of 60 lbs. without being compressed. *Principes Raisonnés d'Agriculture*, tom. ii. p. 328.

* Principes Raisonnés d'Agriculture, tom. ii. p. 315, §630. It is difficult to ascertain the precise degree of evaporation arising from fresh dung; but, by an experiment made by the Rev. St. John Priest, Secretary to the Norfolk Agricultural Society, in the presence of Mr. Curwen, of Workington, it was found that steam was evaporated by a piece of moist ground held under a large glass during a quarter of an hour, in the month of October, at the rate of about 1½ cwt. per acre. Survey of Buckinghamshire, p. 274.

This indeed, appears a large amount within that space of time; but, had the experiment been longer continued, it would have been much diminished, and would, no doubt, in a short time, have entirely ceased.

perhaps half its bulk; but it is considered peculiarly favorable, and even necessary to the growth of that crop, as its power upon vegetation advances it so rapidly as to put it promptly out of the reach of the fly.* When, however, the process is carried too far, and the manure has been frequently turned—until, as said by some farmers, *'black butter* becomes *black snuff;'* it has then, indeed, been found so completely deprived of its nutritive sap as to produce no effect whatever upon the land. On the whole, there is reason to believe 'that there is, in the management of dung, as in all things else, a certain point which constitutes the maximum of profit, beyond which there is nothing but loss.'†

The *management of farm-yard manure*, upon light and heavy soils, should differ according to the use intended to be made of it; for it is generally employed in different seasons and applied to different crops. For light land, on which the most common crop in the commencement of a rotation is usually turnips, it requires to be highly fermented; because, if not incorporated with the ground in that soft and sappy state in which good spit-dung ought to be, the plants will not receive such immediate nourishment as will serve to push them into rough leaf before the attacks of the fly. But for clays and other strong soils generally, whether the manure be applied to fallow under preparation for an autumn sowing of wheat, or in the early part of the spring for beans, as it has a longer time to decompose in the soil, a less degree of putrefaction is necessary than for turnips. Potatoes, also, though grown on light land, may be raised by the use of fresh unfermented manure, because they do not require the same nutriment as turnips during their earlier growth, and because they are also supposed to be assisted by the action of long dung in opening the soil.‡

When, therefore, a farmer looks chiefly to a prompt return through immediate benefit to the next crop, the manure should be thoroughly rotted to the condition of spit-dung; 'but if his views extend to subsequent crops, or if the soil be of a nature to receive benefit by the fermentation and heat produced by the application of long dung,' then it has been affirmed 'that preference should be given to that in a fresh state, provided it be immediately ploughed in and totally covered.'§

This, however, although the opinion of the author whom we have just quoted, as well as that of several eminent practical men, should yet be received with a certain degree of caution; for besides the objections already stated to manure of this description, there is such difficulty in ploughing in the straw, that much of it is necessarily left upon the surface of the soil, where its virtues are in a great measure lost; or, if buried deep in cold and retentive clays, it becomes locked up in the land, and its fermentation is prevented. In order to bring it into such a state of decomposition as we have already stated, the information which we have collected on the subject may be thus condensed.

On most farms the *yards are commmonly cleared* towards the middle, or the latter end, of April; though in some this does not prevent the work from going partially forward during the winter, and thus preparing some of the manure in succession: at whatever period it may however be done, the following is the most advisable method of proceeding.

The most usual mode is to carry out the dung from the yards, either to some waste spot adjacent to the homestead, or into the field to which it is meant to be applied, and there to leave it exposed to the weather, without any other preparation than turning it over, until it be completely rotted, or else until such time as it may be thought requisite to lay it upon the land. The better plan, however, is to lay a bottom for the dungstead, consisting of a bed formed of clay or sand, ditch and road scrapings, marl, or any similar substance, which must be well mixed and pulverized, and then spread to the extent in length and breadth which it is supposed the heap will cover, and from a foot to 18 inches in depth, but raised at the sides and sloped to the centre, so as to absorb the liquor which oozes from the dung during the heating and putrefaction which always take place while it lies in the heap. The yard dung is then carted out, and shot upon the bottom; one end of which is at first left lower than the other, in order to render the ascent easy to the cattle—a practice, however, as we shall afterwards see, which is not always to be commended. It is then thrown slantingly up until the heap rises to four or five feet above the foundation; after which careful farmers raise a coating of the same materials as the bottom, a couple of feet in thickness, which is spread round the heap to its full height: or, when the mixen is raised upon the field in which it is intended to be applied, the soil may be ploughed around the heap, and plastered or faced up against the sides by the back of a spade. The dung is then allowed to duly ferment, which may be seen by its sinking, and easily ascertained by thrusting a few sticks, of the common size of broom handles, into different parts of the heap, as well as by its steaming and offensive smell, which, however, subsides when it is thoroughly decomposed. Dark-colored putrid water is also drained from the heap, and there can be little doubt that this discharge of vapor and fluid will, if permitted, occasion the loss of some portion of the virtues of the manure; in order to guard against which, a thin coat, of the same kind as the sides, and made as fine as possible, is laid regularly and lightly over it, so that its weight may press equally, and not heavily—for, if left in lumps, their cumbrous weight would force the dung into holes, and prevent its regular fermentation.

By this covering of the dung with a due proportion of earth, or of other coating, that loss is

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* Young, indeed, says, 'that long stable-muck has been carried out from turnips in March, without any stirring, and that the crops were as good as from short muck, though the growth of the plants was not so quick; but then 15 loads of the former were laid on instead of 12 of the latter. Long and short dung have also been mixed together, and laid upon strong land, with good effect. It was carted from the yard late in the spring, forming heaps, which in three weeks were turned over, and, within a fortnight more, were laid upon turnips; but the practice is not common, nor very likely to be generally followed.—Norfolk Report, chap, xi. sect. iii.; Essex do., pp. 229, 240.

† Surveys of Bedfordshire, p. 506—508; East Lothian, p. 159.

‡ General Report of Scotland.

§ A Treatise on the Connexion between Agriculture and Chemistry, by the Earl of Dundonald, p. 98.

however in a great measure prevented; and the bringing of the heap into a state of preparation either sooner or later, as circumstances may require its application to the land, can be effected by the denseness and compression of the covering. The operation therefore requires considerable delicacy; for, if dung, already in an unfermented state, be so closely pressed as to effectually exclude the air, it will be found, perhaps at the distance of several months, in a state very little different from that in which it was put up; or, when it is thought to be in a perfect state of preparation, it will, upon examination, be discovered to be only decayed, and, instead of abounding in rich mucilaginous substance, to consist almost entirely of mere vegetable earth.

This also leads us to remark on the common practice of *driving carts, with their loads, upon the dunghills;* the consequence of which is that, as nearly the same road is followed by each cart in crossing them, it is not possible to draw load after load upon such a heap without compressing those parts where the horses tread, and thus, instead of the dung undergoing a regular fermentation, which every part necessarily would if it had been thrown loosely on the heap, and of one uniform thickness, it is, in some spots, consolidated into a mass which, in most instances, greatly retards, and in some entirely prevents, the process; "becomes mouldy from want of air, caloric, and moisture,—acquires a musty, turbid smell,—generates fungi—and is, in that state, injurious to vegetation."* The system has indeed been defended by some very able men, one of whom insists "that the dung should be drawn out of the yards, and placed upon the bottoms, though not in the usual way of throwing it up loosely, to cause fermentation, but, on the contrary, by drawing the carts, with their loads, *upon the heaps*, for the purpose of compressing the dung, and thereby *preventing fermentation;*"† and another conceives that "a positive benefit will be gained by this slight compression."‡

This difference of opinion may however have arisen from attention not having been paid to the different qualities of the dung, as well as to the use intended to be made of it. When the materials removed from the yard consist chiefly of litter in a fresh or rough state, not sufficiently saturated with the urine of cattle, or when the manure is not intended to be immediately applied to the land, no serious damage can ensue from driving the carts—which are usually drawn by one horse—across the heap, when the dung has risen to some height upon the foundation; but if that operation be performed before some considerable portion of the dung be laid on, the inevitable consequence will be that the bottom, which consists either of earth or of other matter devoid of elasticity, will thus be kneaded into solid and unequal lumps, which will occasion the effect complained of. Care should therefore be taken to make the heap so narrow, that by driving on each side of it, the carts may be backed, and the dung shot upon the pile, which may then be levelled with grapes, or forks, and laid compactly together. Much labor of the teams will thus be saved: if the object be to prevent fermentation, the dung may be regularly and closely trodden down by the men employed in spreading and levelling it; and the quantity of earth to be laid over it may be regulated accordingly. If, on the other hand, the manure be intended for immediate use—then the dung should be thrown lightly together without treading, and the quantity of earth on the sides and top should be reduced; or, if the dung be of a hot nature, from which too sudden or violent fermentation may be apprehended, a portion of the earth may be intimately blended with it, and it will thus be soon brought into a fit state for application.

It must not, however, escape observation, that store cattle are often kept in straw-yards apart from other stock; or else that, when the same yard is used, the stable-litter of horses is thrown separately out, and thus produces two very distinct species of dung. Attention should therefore be paid, in clearing the yards, to take a few cart loads from each kind alternately, so that the whole may be, as nearly as possible, equally mixed, and heat alike. It will thus also be seen if any portion of the dung is too dry, in which case it should be distributed among that which is wet; and if there be any general deficiency of moisture, or if the external parts of the heap become dry during the process of fermentation, they should be thoroughly wetted. The heaps, too, should be of moderate size, by which means they can be turned and got ready at different periods, as occasion may require.*

These *pies*—as they are provincially termed when thus crusted over—if ready by the 1st of May, may be reasonably expected to be in a fit condition to be laid on the summer fallows by the latter end of July, though the time required for their preparation must be governed by the strength of the dung, the weather, and the exact period of its intended application. Those formed during the summer months, unless the dung be produced by horses and cattle kept in the yards by soiling on green food, can seldom be collected and got ready for use within the same season: but when intended for turnips, the manure should be carried out and lightly raised about six weeks or two months before it is wanted, with-

*Malcolm's Compendium of the Modern Husbandry of Surrey, Kent, and Sussex, vol. ii. p. 5.

† Blakie on the Management of Farm-yard Manure, edit. 1828, p, 13. See also Sinclair's Code of Agriculture, 3rd edit. p. 218.

‡ Brown of Markle, treatise on Agriculture and Rural Affairs, vol. i. p. 375.

*On this subject, Mr. Coke is said to have lately expressed himself, at a public dinner in Norfolk, to the following effect: "Having made a platform of marl, I placed the inferior muck upon it; the manure of the fat cattle formed the third coating, and upon that the horse-dung as the fourth, and in about equal quantities. I then ploughed round it, threw up the earth, and made a kind of coating over the whole, to keep in the gas. Just before sowing, the heap was turned over; and thus, when the muck was in a state of fermentation, it went into the drill. Let farmers follow this plan, and give plenty of seed, and they will not find their crops of turnips to fail; the warmth of the manure would force the turnips out of the way of the fly in less than eight-and-forty hours. In Dr. Rigby's account of Holkham, it is also stated that, by preparing manure in this manner, Mr. Coke saves no less than 500*l.* per annum in the purchase of rape-seed as a top-dressing.—3d edit., p. 56.

in ten days or a fortnight of which time it should be very carefully turned.

The *operation of turning* is also one that requires circumspection. This is often neglected until the heat of the mixen is quite spent, its fermentation passed, and it has become entirely rotten. To which glaring error is to be added the carelessness employed in that labor by servants, who, in turning it over, usually begin at one end, and throwing layer upon layer as they cut them through, place them again in the same order in which they found them, with this only difference, that the part which was at the top now becomes the bottom. Thus it has been justly observed by Mr. Malcolm, that 'benefit which might have accrued to each ingredient by the proper admixture is infallibly lost, because the dung has been prevented from infusing any of its saline particles into the mould, and when laid upon the land, instead of being a body of invaluable manure, they are little better, as such, than as if each ingredient had been immediately drawn from the beds out of which they were originally taken.'* All this may, however, be easily avoided by cautiously observing the probable state of the fermentation of each heap, and by turning it completely over either when it requires lightening or pressure; by narrowly watching the process, so that every part may be thoroughly shaken up, the clods and lumps in the bottom, top, and sides, well broken, the adhesive parts of the dung separated, and moisture added, if necessary. When this process has been attentively performed, it has been recommended by Mr. Blaikie 'to immediately plough several furrows of the natural soil all around the heaps, and with the loose earth ploughed up again coat the heaps all over: the pies will then take a gentle fermentation; the earth intermixed with, and covering the dung will absorb the juices and gasses of the dung, and the compost will come out in a fine state of preparation for using on turnip land.'† From manure of this description, in which all the materials are intimately blended, soaked with putrid water, and decomposed to a degree of mellow consistence; different sorts, to suit different soils and crops, cannot indeed be taken; but perhaps, with the single exception of potatoes, this one sort of farm-yard dung, managed as above, may be successfully applied to every crop, and to every kind of soil.

[To be Continued.]

"FACTS" AS TO FEEDING WORK HORSES AND MULES. REMARKS ON MANAGEMENT THAT IS NOT UNUSUAL.

To the Editor of the Farmers' Register.

Charlotte County, Va.,
New Year's day—1836.

Your call for "facts" in one of the back Nos. of the Register has not received the attention from correspondents that it really deserves. Were I disposed to find fault with your paper for any thing, it would be, that so little is said about *facts*—even in the small way noticed in this communication. I was glad to see *your eye* directed to these things, and would be still more rejoiced to see your columns enriched with those things called *facts*—for you know they are stubborn things, and cannot be gotten over.

First then, let me state a few that have fallen within my observation—perhaps others more useful may be elicited from the bare mentioning of these. That I should make a short crop of corn twelve months ago last July, was a *fact* so plain to be seen, that my overseer was directed to suspend our *old practice* of giving the work-horses corn three times a day; and having only a moderate crop of oats, he was also directed to shorten his usual allowance of this most excellent and perhaps the very best of food. His reply was (to use his own expression, and I believe a common one) "the teams can't be kept up on so small an allowance." However, the fact was, my prospect for corn forbade a compromise—accordingly we went to work with the determination to do the best we could—(which was not to buy corn.) My teams amounted to four horses and two mules. My stock in trade, at gathering time, was about fifteen barrels of old corn, and ninety barrels of new—ten stacks of oats—ten of hay, and a few bushels of wheat—a small stock of hogs, &c. &c. My family numbers about two dozen eaters. About eighteen months have now elapsed, and I have just commenced on my crop of new corn—nearly the whole of my last crop of wheat yet on hand—all of the oats, and nearly all of the hay now in the stacks—my family in good health—the teams and stock as fat as any in the neighborhood—and all things promise to move on as usual. But it will be asked "how was this done? Surely the horses, and *poor Cuffees* especially, had a hard time of it. This was abolition with a vengeance," &c. &c. Well to the law and testimony.

My practice, as to feeding the "poor Cuffees" was as it always has been, viz: three and a half gallons of meal per week—three pounds of bacon, with what few vegetables could be had from a very poor garden. The horses were fed principally on oats, so long as the ten stacks lasted, which was until the last of April—sometimes a little hay or fodder, and occasionally the addition of five ears of corn; but until last June, I think, it was positively against orders that a horse should have even that. When we commenced "laying by" corn, (which time is here considered the hardest of the working season,) they were allowed five ears of corn at each feed; this lasted not more than ten or fifteen days—for as soon as it was practicable to cut clover, we gave to each horse as much as he would eat in a green state: after the crop of corn was "laid by," my horses never so much as tasted corn, until here lately we begin again to give five or six ears at a feed. They were fed on clover alone as long as it was fit to feed in the green state—then it was given well cured. But, Mr. Editor, a *fact* worth recording, is, that my mules for the space of sixteen months never knew what corn was—eight months of which time they were kept up on clover alone. Were I to have mules the balance of my days, they should never see corn again—unless in a freak of good nature I might allow them to sweeten their palate, if any they have, with an ear or two of good sound corn. The crop made under this management was equal to, or better than my usual crops. One of my neighbors being in the same predicament, followed suit—his teams having been kept

*Compendium of Modern Husbandry, vol. ii. p. 6.
†On Farm-yard Manure, edit. 1828, p. 15.

up on green clover pretty much in the same way; and were I permitted to offer advice to you or your readers, it would be, to save *one-half* of your corn by a course of management somewhat like this. Now this is saying a good deal for clover. Can as much be said for any other grass? Can as much be said for herds grass?—against which, except as a meadow grass, I have declared war ever since 1825.

It has been said, "the master's eye is half feed." I have never felt the truth of the remark so forcibly illustrated, as in the facts above mentioned. Instead of *telling* the ostler to feed well and curry well, my plan was to rise rather earlier, and walk to the stable, where every thing like negligence and inattention might at once be corrected. At 12 o'clock, instead of lolling on the bed, or taking a seat at the chimney corner with a pipe in my mouth, the same thing was repeated. Thus, by attention and regularity, we all had bread enough, and our horses are in good condition. There is another thing about our teams, too much neglected, which merits severe reproof, and is as shameful and scandalous a practice as it is barbarous and ruinous—I mean *gearing* the horse. How often do we see horses, belonging to the wealthy—aye! *humane* farmer, not only rubbed until it becomes a difficult task to say whether they have been in the hands of some unskilful barber, or forced through a brush fire—but with shoulders and backs as raw as a piece of fashionable beef-steak. What else, Mr. Editor, can we expect—for if you will examine the collars, perhaps half has been eaten up by the more than half-starved cattle—the balance carefully wrapt around the poor animal's neck. Instead of a good substantial hamestring, made of leather, you will find nothing but an old twisted hickory-switch; with the but end probing a sore of some months' standing. Look, sir, at the traces. Link after link has given way, until you can hardly say which of the two is most in need—the carpenter or blacksmith. And as for back-bands or belly-bands, the poor animal is corded up with grape-vines or elm-bark, until he can scarcely draw a comfortable breath. These things are *facts*—whether they are worth the trouble of recording in the Register remains for you to decide. And there are many other facts which might be mentioned like those already stated, but I must forbear, least a complaint be heard from some of your readers. So I will conclude, with the addition of one more—though last, not least worthy to be noticed—that is, if you are scarce of horse provender, feed with a sparing hand in the fall and winter. As spring comes on, deal out more liberally—for during the sound healthy weather of fall, as well as the cold short days of winter, a horse will endure more fatigue, with less food, than he can possibly sustain in the relaxing months of spring, or still more parching sun of a summer's day. There are farmers about here who have the reputation of being good managers, whose horses are always fat and sleek in the fall—but rough and bony in the summer; this should not be, and like some of my friend's proverbs, makes another "great evil under the sun."

W.

[It is to be regretted that our correspondent should have deprived his statement of very important facts of half their value, by withholding his name—for this is the certain consequence of the use of a fictitious signature to all readers who have not the advantage, (which we possess, in this case,) of knowing the high respectability of the source whence the information proceeds. But in this respect, we must be governed by the will of the correspondent.

The minute statement given above, shows more fully than we had supposed—though long satisfied ot the general fact—that we feed horses generally at much more expense than is necessary to preserve their health, flesh, and strength. But this fact, however valuable, and however well established, can only be made proper use of by a farmer who attends as closely to the feeding, as our correspondent, (or who has the rare good fortune to have an overseer who will pay the same attention to his interest—) and who also has a largesh are of that *horse-knowledge*, which seems to be a natural quality, and no more to be acquired, than a talent for painting or poetry. The phrenologists have placed no such organ as this in their list—but if there was any truth in their system, they would doubtless have discovered on many human sculls, and especially in Virginia, a bump showing the love for, and knowledge of horses. Of such an organ, however, we must confess our entire destitution, as well as of the system of good management which might compensate for its absence—and consequently, like the greater part of our fellow farmers in Virginia, our stable *mis-management* has been not very unlike such as our correspondent describes in the latter part of his letter. Though long sensible of the waste and impropriety of heavy feeding, we had no other safeguard against still greater injury to horses and mules, if their food was ordered to be reduced below what they would consume and destroy. If W. was our neighbor, we should have suspected him of designing to include our farm in his general description. This *egotism* may be excused, because our errors and losses in this respect, are the same with thousands of others, who are compelled to manage through ignorant or unfaithful agents. Though amply provided with clover, and desirous to use it as green food, we have never been able to do so to any considerable extent for working teams. Though cut a day before being used, the overseers would declare that the horses would "give out," upon even a part of their abundant food being green—and as they can always assure the fulfilment of their prediction, the proprietor must yield. When there is no scarcity of corn, our horses are generally both over-fed and over-worked: and the consequences are, that the excess of food serves to impair the health and strength of the animal, and the 12 or 14 hours work in a long summer's day, amounts to less than 10 hours would give, with rest the balance of the time.]

THE RIGHT OF COMMON AS ESTABLISHED BY LAW.

To the Editor of the Farmers' Register.

Fairfax County, Jan. 8th, 1836.

Since the General Assembly determined that it was not good or right to protect real estate and give it the same inviolable character that all other

property receives, I have thought it a folly to talk or write about improvement. For, sir, who will or can be such a fool as to take property that is sacredly and exclusively his own, and spread it upon real estate that he holds in inseparable common-right with every gentleman and scoundrel in the state. I say *inseparable*—because the law of enclosing is an absolute mockery; you cannot escape from this infernal hotchpot in this way. Let me show you this melancholy fact by demonstration. Let us assume that A has 100 acres of land enclosed with good and lawful fence; he is peaceful and prudent; he obtains a warrant to have his fence viewed. All is given—and believing himself safe and secure, he goes to work, expends $1,000 upon it in manure, lime, and grass seeds—nature responds and sings for joy: it is the admiration of every one who sees it: the owner in the pride of prosperity, has said in his heart "this is mine"—this is the reward for "mind and industry." Another day, and he is told the mules and hogs of a careless neighbor have broken in upon him and spoiled and destroyed his crop. Indignant, he orders their destruction—but his wife, or a friend whispers "that is not lawful, you can only kill upon the third offence;" he therefore waits for two other October nights of waste and destruction; it is done—mules, hogs, and all lay in promiscuous destruction and death. The owner, careless as he is, watches his right of common, and comes with two or three convenient friends, equally anxious about the right of common. They view the fence and readily conclude that it is not lawful. Suit is ordered for damages, and A is tried by a judge, a jury, and witnesses, all interested and anxious about the right of common, or as it is called in the more artful classes "the right of spoil." The fate of poor A, though destructive and discouraging, brought "healing in its wings;" he sold out and went to the "far west." No man can, or will upon any rules of prudence, improve real estate when he is told from the very house-top, that it must be common to all; no sir—all, all is lost to poor Virginia. I have passed through the limestone valley, the mountain and the plain, and all is lost—wealth, industry, and enterprize are all upon the wing. It is a melancholy thing thus to see the pride and bone of a land leaving it, never to return, and yet more melancholy to think that you cannot go with them. I hold it undeniable, sir, that no people can be counted strictly civilized, who hesitate in the protection of property; and he who believes men will be honest unless bound by the law, must be in callow-feather—a mere gosling. It is the province of fools to hope for *hopeless* things, and thus spend their lives. I return you many thanks for your very able labors in the cause of our country, and hope that your reward is ample.

Respectfully,

JEREMIAH.

P. S. Some forty years and more since, Gen. Washington enclosed his entire estate at Mount Vernon. He was not sustained by the spirit of the law, or society, and was obliged to go back to barbarian hotchpot He was denounced for the attempt as a military tyrant!

J.

From the Liverpool Journal.

KYAN'S METHOD TO PREVENT DRY ROT.*

The new steam boat launched on Wednesday, for the city of Dublin Company, is entirely built of wood prepared by Mr. Kyan's process, for which he has taken out a patent. The preparation consists in letting the wood lie for some time in a solution of corrosive sublimate, which impregnates it, and it is said prevents the dry rot. We stated, some months ago, that an extensive course of experiments, at Woolwich, had completely established the fact that Kyan's process does totally prevent dry rot in timber. We have since met with the report from the House of Commons on the subject, and as the matter is of the utmost importance to the shipping interest, as well as to house builders, we have made the following abstract.

The commissioners appointed by the Admiralty to inquire into Mr. Kyan's process, are John Hayes, Dr. Birkbec, Messrs. T. F. Daniel, A. Copland Hutchinson, and B. Rotch, Jr. They report as to the general efficiency of the process, that timber, canvas, and cordage, thus prepared, had been tested by comparative trials, lasting for years in a variety of ways, at Woolwich, Margate, London, Sheerness, and in no instance had the dry rot attacked them, while unprepared timber, &c., had invariably decayed under the same experiments. That the process renders the ordinary length of time for seasoning timber unnecessary. That the solution diminishes in bulk by absorption, but the remainder is of the same strength as at first. That the additional expense of building the Samuel Enderbey, a ship of 420 tons, entirely of the prepared timber, £240; and that the Admiralty are to pay 15s. a load extra for such as may be used in the construction of the Linnet. That the process was not in the least unwholesome, and that the crews of the two ships, wholly built of the prepared timber, were reported "all well" from the South Seas and Indian Ocean. That the bilge water in a ship built of the prepared timber, was pumped out "perfectly sweet."

No doubt can now be reasonably entertained as to the efficacy of the process. That it will be generally adopted we are confident, and the saving will be immense. It is not solely by ship builders that the prepared timber is used. Sir R. Smirke (well known as an eminent architect in London) has introduced it into most of his buildings, and was one of the witnesses in its favor before the committee. Certainly all public buildings should have the advantage of the process. The state of the timber at the Lunatic Asylum in Liverpool is abundant evidence of the injury done to wood by dry rot.

It is supposed that government will purchase the remaining time of the period from Mr. Kyan, and throw it open for gratuitous adoption. Certainly there can be no public objection to this. Dr. Carmichael Smith got £5000 for his disinfecting process; and this discovery for preventing dry rot in timber, is of far greater importance to the public at large.

* A full account of the effects of this valuable discovery was published in a former No. of the Farmers' Register,

REPORT OF THE CHIEF ENGINEER ON THE RICHMOND AND PETERSBURG RAIL ROAD.

To Messrs. Joseph Marks and Son; Lewis Webb & Co.; Lancaster, Denby & Co.; John H. Eustace; Jacob Barns & Co; David I. Burr & Co.; R. B. Haxall; F. & J. S. James & Co, and others, of Richmond; and Charles F. Osborne, Robert Bolling, Samuel Mordecai, and others, of Petersburg; subscribers to the survey for a Rail Road between Richmond and Petersburg.

Gentlemen—I have the honor to present you the following report on the surveys which have been made under my direction, with a view to a rail road between Richmond and Petersburg.

It was ascertained, on a reconnoissance of the country, that a line east of the present turnpike would probably present more numerous curves, and a much larger aggregate amount of deflections, than one west of it. It was thought, however, that it might possess an advantage, in admitting hereafter a connection with Bermuda Hundred by a short and economical branch rail road; that the elevation of the dividing ground between the waters of the James and Appomattox would be less on such a line; and passing, as it would for a considerable distance, along the valley of James River, that the expense of roadway formation would be materially diminished. The line traced east of the turnpike has in this respect disappointed the expectations which had previously been entertained. Whilst there appears no great superiority in the character of the portion of it next to Richmond, over the corresponding portion of the line west of the turnpike, the dividing ground is found to maintain its elevation; and as it is to be ascended from more depressed levels, the amounts of excavation and embankment in passing it are, in consequence, very considerably increased.

It was deemed most advisable, under these circumstances, to predicate the estimate to be made on the presumption of the adoption of a line west of the turnpike. The length of a branch rail road to Bermuda Hundred, from such a line, will be increased about two and a half miles; but this disadvantage will probably be deemed of less moment than the adoption of a main line to Petersburg, more expensive in its first cost, and on which, in consequence of more frequent curvatures in its plan, the maximum velocity which may be attainable would be necessarily somewhat impaired. The idea has presented itself, on an examination of the plans and profiles since the completion of the survey, that possibly a line passing west of the turnpike as far as the dividing ground between the two rivers, afterwards crossing the ridge obliquely to a point on the line east of the turnpike, near the crossing of Ashton's Swamp, and thence passing in the neighborhood of the last mentioned line to Petersburg, might, on the whole, present more advantages than any other location. Such a line is at any rate deserving of investigation by the stockholders who may be incorporated to execute the work. It would prove somewhat longer than a line entirely east or west of the turnpike, but would present fewer curvatures than a line altogether east of it, and the length of a branch rail road to Bermuda Hundred would not thereby be increased.

The line selected as above mentioned, as a basis for the estimates which have been made, may be thus described.

Commencing at the intersection of the Manchester and Petersburg turnpikes, at an angle of 4° 45′ with the latter work, it is perfectly straight to the crossing of Proctor's Creek, nearly half the distance to Petersburg. It afterwards, in passing up a branch of this stream, deflects to the left, until it attains the dividing ground between Proctor's Creek and Ashton's Swamp, when it again bends to the right for about 4000 feet; after which it pursues a course varying but little from that of the first portion of the line, across branches of Ashton's Swamp and Tinsbury Creek, about two miles, to station 395. From this point a line nearly straight has been traced to the Appomattox, opposite Mr. McKenzie's.

The grades adopted on the line above described vary between a level and thirty-seven feet. It is believed, on a fine location, that the steepest of these may be reduced, and that no grade need be adopted exceeding thirty-three feet per mile.

In regard to curvature, a consideration of greater moment where high velocities are desirable, the line surveyed is excelled by but few in our country, or the world. There need be on it not more than three or four changes of direction at farthest, and no radius of less than two miles.

The whole length of the line is nineteen miles and forty-two hundred feet. Its extension to convenient points of termination within the towns of Richmond and Petersburg would increase the distance about two miles.

It has been deemed most advisable, for obvious considerations, to defer any surveys with a view to this object; until the organization of the company. It will then become a subject of consideration for the inhabitants of the two towns, and the stockholders of the company, how far the introduction of the improvement within their limits may be important to the attainment of its ends. There can be little doubt that whatever determination may for the present be adopted in regard to it, its connection with the Richmond and Fredericksburg rail road should be ultimately looked to.

The following estimates are believed to present a fair view of the cost of the improvement. The aggregates embraced in the estimates for roadway formation, with the exception of the eleventh and twelfth items, are the result of minute calculations of the cubic contents of excavation, embankment, and masonry on the whole work. It has been deemed unnecessary to give these in more detail.

Grubbing and clearing, averaged at $250 per mile,	-	-	-	$5,000	00
61,647 cubic yards excavation, at ten cents per yard,	-	-	-	6,164	70
201,862 do	at 12 cents,		-	24,223	44
217,104 do	at 13 do		-	28,223	52
114,282 do	at 15 do		-	17,142	30
105,801 do embankment at 11 cts. per yard,	-	-	-	11,638	11
203,406 do	do	14	-	28.476	84
314,889 do	do	15	-	47,234	85
7,090 perches of masonry, at $4.50,			-	31,905	00
1,400 do	do	at $2.50,	-	3,500	00
				$203,508	76

Amount brought forward -	$203,508 76
Cost of extending rail road into Petersburg, including bridge across the Appomattox, - - -	30,000 00
Do. into Richmond, including bridge across the James, - -	125,000 00
Twenty-two miles superstructure, at $3,500 per mile, - - -	77,000 00
Add for purchase of land for depots and workshops, and the erection of necessary buildings, - - -	37,000 00
For locomotive engines, cars, and carriages, - - - -	55,000 00
For superintendence and contingencies, sidelings, condemnation of lands &c.—ten per cent. on cost of road,	43,550 87
Total,	$571,059 63

The above aggregate it is probable may be somewhat reduced on a definitive location. Though not much exceeding what had previously been anticipated by the undersigned, it will probably disappoint the expectations of those of the subscribers whose impressions as to the cost of the work were founded on that of the Richmond and Fredericksburg, and Petersburg rail roads. Involving, as the work in contemplation does, two expensive bridges, it could under no circumstances have been a *cheap* one; and the country between Richmond and Petersburg, it was presumed, would present more difficulties in the way of roadway formation than had existed on the lines of rail road above mentioned. There can scarcely however be a doubt that, even at its increased cost, the stock of the road will prove an excellent investment. Forming, as it will, the closing link in the great line of rail road communication through the state, it will of course command the northern and southern travel, whilst it will, in addition, accommodate a local travel already considerable, and which will be necessarily very greatly increased by the execution of the work in question.

In addition to travel and the mail, a handsome trade may at any rate be anticipated on the rail road. Coal for the supply of Petersburg will be conveyed on it more advantageously and cheaply than in any other manner. Cotton for the consumption of the manufacturing establishments in Richmond, it may be presumed, will be obtained in the same manner; and whilst the effect of the improvement, by adding to the facilities for personal intercourse between the two towns, will probably diminish the inducements for the transportation of produce, there can be no doubt that a fair proportion of whatever *is* conveyed will be secured to the road, even at some enhancement in the price of transportation.

Those of the subscribers who are familiar with the travel and trade between Richmond and Petersburg will be enabled to judge how far the subjoined estimate of the receipts of the rail road will be realized. It is submitted under the belief that it does not at any rate *exceed* what may safely be anticipated within a very short period after the execution of the improvement.

It will be unnecessary to dilate on the benefits, in other respects, which may be expected to result from the execution of the proposed work. Bringing the towns of Richmond and Petersburg within one hour's travel of each other, it will give to the merchants of either town, facilities for the transaction of an extensive business, greatly beyond those now enjoyed by them—to the country tributary to each, the advantage of the capital and enterprise of both—and, to the state at large, the benefits of a commercial metropolis of twenty-five or six thousand inhabitants instead of one of seventeen.

All which is respectfully submitted.

MONCURE ROBINSON, C. E.

Richmond, Dec. 19th, 1835.

Estimate of receipts on the proposed rail road from Richmond to Petersburg.

45,000 passengers at $1 25,	$56,250 00
Transportation of the mail,	6,000 00
8,000 tons of coal, at $1,	8,000 00
7,000 bales of cotton, at 50 cents,	3,500 00
Miscellaneous articles,	5,000 00
	$78,750 00
Deduct for expenses of transportation, officers' salaries, &c.	30,000 00
Net balance,	$48,750 00

The above balance, it will be observed, would pay a dividend of between eight and nine per cent. on the cost of the work. The amount estimated for expense of transportation, it will be seen, is somewhat less than the proportion usually allowed. It is believed however to be ample for the business on which the estimate is predicated. Consisting, as this will principally, in the transportation of persons, the net receipts of the company may be expected, from this circumstance, and the limited extent of superstructure to be renewed, to constitute an unusually large proportion of its gross income.

It is left for those who may take an interest in this improvement, to determine how far its productiveness will probably be increased by the execution of similar improvements south and west of it. Whatever its immediate receipts may be, there can be but little doubt that these will continue to augment with the growth of the towns which it connects, and the increasing intercourse between different portions of our country.

DESTRUCTION OF BUILDINGS BY GUNPOWDER, TO ARREST THE PROGRESS OF FIRES.

[The recent great fire in New York, a calamity unprecedented in extent and importance in this country, was at last arrested only by the use of gunpowder, in the manner described in the extract below, which we take from the New York American. The plan is a novelty to us, and we presume must have been so to most of those then suffering, or endangered by the fire—or they would much earlier have availed themselves of a means so powerful and efficacious, and yet so safe in its application. It would seem, that instead of forbidding the keeping of gunpowder in cities, for fear of fire, a considerable supply should be always at hand as the surest and safest means of arresting the progress of its destructive fury, when other means would be feeble or entirely unavailing.]

Having witnessed and assisted in the whole operation of blowing up the stores that were destroyed—we have the most thorough conviction that no other human means, but that of powder in the manner resorted to, would have checked the progress of the flames.

Broad street, and Pearl street, west of Coenties alley were, beyond all peradventure, saved from conflagration, by the blowing up of the stores in Garden street, that in Pearl street, and those in Stone street. The effect was so manifest, that none who witnessed it can doubt about it. Not less clear is our conviction, that a much earlier resort to powder would have been successful in preserving millions that, for the want of it, were subsequently consumed.

It may not be uninteresting, or without use to state the mode of proceeding adopted in blowing up the stores. Two barrels of powder, generally of 100 pounds each, were taken into the cellar of the devoted building, and placed about the centre of it, at a small distance apart: the heads of the barrels were then knocked out, and a train, by means of planks, or long pieces of calico or linen, of which too many were lying about in the streets, was formed from the barrels to the exterior of the cellar door; on this, straw, of which the crates from the crockery stores supplied enough, was laid, and sprinkled plentifully with powder; the doors were then closed, and all persons desired to retire from the vicinity of the building, except the one who was to fire the train. This was done by laying a burning brand on the straw projecting from the cellar way, and on which, for a foot or two, no powder was sprinkled. After a few moments of intense suspense, a sudden flash, a rumbling explosion, a slight tremor of the earth, the audible shivering of glass windows for a hundred yards around, a dense cloud of sulphureous smoke, and a shapeless heap of ruins, told how well the work had been done. The effect of these explosions was not to project any thing at a distance, for in no one instance probably, was a fragment of any size thrown from the buildings; but rather as it would seem, to lift up and expand the walls—so that beams, floors, merchandize and roof all fell in at once, and upon them and covering them up, the walls themselves. Hence, it was immediately perceived that the danger apprehended by some, of killing and wounding many persons by the materials which such explosions would, it was supposed, scatter far and wide, was not incurred, and that moreover from the compact heap in which the ruins laid, little or no additional aliment was afforded to the flames. Greater confidence was therefore felt in having recourse to such an expedient.

GREAT AND IMPORTANT INVENTION. STEAM SUPERSEDED.

[Who would have imagined that when Homer conceived and uttered the fiction of Eolus' compressing the winds in leathern bags, and giving them to Ulysses to be transported wherever he pleased, thus imprisoned and dormant, to exert all their fury when afterwards let loose, that he was describing nearly the purport of the specifications of the patent right stated below? But however striking and amusing may be the resemblance, we admit that it will not do to laugh at all new discoveries that seem to invite ridicule. For if this test had been permitted to govern the judgement of the world, the invention of steam navigation and steam carriages would have remained, as they were deemed at first, mere subjects for laughter. The splendid results of these once derided schemes, and many others, by which the world has been as much benefitted as disappointed, should make us hesitate in pronouncing the impracticability of any, however ridiculous they may appear at the first view.]

From the Cincinnati Whig.

Our ingenious townsman, Mr. Alex. McGrew, has invented a mode for obtaining and applying power for the purpose of propelling cars upon rail roads, and boats upon canals and rivers, which we deem of the utmost importance, and which, in our opinion, must sooner or later, in a great measure supersede the use of steam. The power is derived from *condensed air*, obtained and applied in a manner so cheap and simple, as to render the expense a matter of little or no consequence. Air used in the manner proposed by Mr. McGrew, has advantages over steam, in many essential particulars. It is infinitely less liable to explosion: but in case of such an event, its power to do mischief is greatly diminished, because of its being unconnected with boiling water. It is likewise much more safe in consequence of its not involving the slighest danger from fire. Where cars or boats are propelled by steam, there is constantly danger from this source, and numerous instances of immense destruction of life and property have therefore occurred from that element. The annoyance, too, arising from the sparks and smoke of steam cars, is very considerable to the traveller, but will be wholly avoided by the use of condensed air. The great and overwhelming superiority, however, of the use of the latter over the former element, consists in its economy. Air may be condensed and used upon the plan under consideration without scarcely any expense, except that which is incurred in the first instance in preparing the receivers and machinery.

We have witnessed, by the politeness of Mr. McG., the practical operation of this invention, and we are fully convinced of its entire success. Mr. McGrew has exhibited his plan and practical models to several of the most distinguished engineers in the United States, all of whom concur in deeming the invention of the highest possible importance, and declare their belief that it will almost entirely supersede the use of steam. The inventor has taken out a patent, and as the schedule furnished at the Patent Office by Mr. McGrew himself, and which is attached to his letters patent, gives a full and clear explanation and description of the invention, we have obtained, and herewith submit a copy of it to our readers.

Copy of the Schedule.

"To all whom it may concern, be it known that I, Alexander McGrew, of Cincinnati, in the county of Hamilton, and state of Ohio, have invented or discovered a more economical mode of obtaining power for propelling cars upon rail roads, boats upon rivers or canals, and effecting other objects where such power may be wanted for the purposes of transportation, than has heretofore been adopted; and I do hereby declare that the following is

a full and exact description thereof. My improvement does not consist in the employment of any newly invented machinery, but in the using of such power from falls or currents of water, or other natural or artificial sources of power as has heretofore been allowed to run to waste, and employing the same for the purpose of condensing air into suitable receivers; the elastic force of which condensed air is to be subsequently applied to the purposes herein designated. In numerous situations in the courses of canals and rail roads, and of other roads and water courses, there are falls of water, waste weirs, sluices, dams, etc.; the power from which, if economized, would be ample for the attainment of all the ends proposed by me. I bring this into use by taking the water power from wheels or other machinery already erected, or by erecting others where they do not already exist, using any of the known constructions of such wheels, or other machinery as may be best adapted to the particular situations in which they are to be employed. These I connect in the ordinary way with the piston or pistons of condensing engines, constructed for the condensing of air, and force air thereby into suitable receptacles, or reservoirs, furnished with the requisite tubes, valves, or other appendages, by which they are adapted to the containing of air thus condensed, and to the supplying of the same in measured quantities, so as to operate upon a piston for driving and propelling machinery as high as steam is now made to operate. The means of doing this does not require any description, being perfectly familiar to competent engineers. The air is to be condensed into one large stationary reservoir, and by means of a connecting tube and stop-cock, transferred therefrom into other reservoirs connected with the vehicle to be propelled. What I claim as my improvement in the art of propelling cars, boats, or other vehicles for transportation, is the employment of the waste power of water, wind, or other natural or artificial sources of power, to the condensation of air in the manner and for the purposes herein before set forth."

From Sinclair's Code of Agriculture.

ON BONES AS A MANURE, AND ON THE USE OF SEA-SHELLS, SHELL-MARL AND CORAL, FOR THE SAME BENEFICIAL PURPOSES.

Introduction.

The use of bones as a manure, is perhaps the most important discovery, connected with the cultivation of the soil, that has been made in the course of a great number of years. By means of that discovery, and the improvements therewith connected, an end is put to every difficulty in producing *at home*, subsistence for the people of this country. We may thus be rendered independent of *foreign produce;* and unless our population were greatly to increase, we should be hardly able to consume, without the aid of exportation, the great quantities of corn that can be raised, under this improved system of production. It has become proverbial indeed, *"that one ton of German bone-dust, saves the importation of ten tons of German corn,"* and that agriculture is thus rendered in a considerable degree practicable, without cattle breeding, grazing, &c. Were the advantages of the discovery restricted to the use of bones alone,* as they might possibly be exhausted, or raised in price, it would be less important; but fortunately the shells of oysters, and other fish, are found to be equally effectual. Shell-marl also, which abounds in many parts of the kingdom, may be applied to similar purposes; and coral, the banks of which are abundant even on our own coasts, is found to be equally useful. In short, it is impossible to foresee, what may be the ultimate results of this new source of improvement, for by a small quantity of pounded bones or shells, great crops of turnips can be raised; and with the manure which these turnips produce, abundant crops of corn may be obtained, even on the poorest soils, with the aid of judicious rotations.

1. *Origin of the discovery.*—The important discovery, that bones were an excellent manure, was made about the year 1766, by Anthony St. Leger, Esq. a gentleman in Yorkshire, who had employed himself, for a great number of years, in a long course of speculative and practical agriculture, and more especially in making experiments with almost every species of manure.† Dr. Darwin mentions it in his celebrated work on agriculture, "*The Phytologia.*"‡ It is likewise briefly noticed in Sir Humphry Davy's lectures.§ But it was not until the year 1828, that it attracted much public attention, when, by the exertions of an active and public-spirited body, (the Doncaster Agricultural Association,) much useful information, regarding the advantages of this great discovery, was collected and published.‖

2. *Chemical analysis of bones.*—The composition of bones, according to Berzelius, is as follows:

	Dry Human bones.	Dry Ox bones.
Phosphate of lime,	51.04	55.45
Carbonate of lime,	11.30	3.85
Fluate of lime,	2.	2.90
Phosphate of magnesia,	1.16	2.05
Soda, muriate of soda and water,	1.20	2.45
Cartilage,	32.17	33.30
Blood vessels,	1.13	

3. *Manner in which the manure operates.*—It is difficult to comprehend, how so small a quantity of manure, as that employed when bones are made use of, should produce such astonishing effects. But the enigma has been thus explained. Though the plants receive but a small portion of benefit from the bone manure itself, yet by means of that manure, strong young plants are produced,

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* The importation of bones ought to be encouraged by a public bounty, and some allowance given to the captains of vessels, who bring bones as ballast in their ships.

† The first account of this manure, was published in Dr. Hunter's Georgical Essays, vol. ii. p. 93.

‡ See Sect. 10. 5. 5.

§ Page 252.

‖ The association appointed a committee, to make inquiries regarding the use and advantages of bones as a manure; and the Report of the Committee of that respectable Association, (which contains much valuable information on the subject,) was published by Ridgway, London, in 1829.

which are thus rendered capable of extracting nourishment, from the substances in which they are placed, and from the surrounding atmosphere. These are acquisitions, the power of obtaining which, sickly or stunted plants do not possess. By the same healthy nourishment, obtained in small quantities during the progress of their growth, the plants are kept in a constant state of improvement. They are thus enabled to absorb the surrounding organic matter, to increase in size, and ultimately to reach their full weight, and utmost perfection.*

4. *On the soils for which bone manure is adapted.*—On light dry soils, bone manure is peculiarly applicable, and it has likewise been found highly advantageous on peat. From 15 to 20 bushels of bone-dust per statute acre, when drilled, have been found to surpass, both on light soils, and on peat, the ordinary dressing of farm-yard dung, and even to exceed pigeons' dung and lime in producing fertility. In wet stiff land on the other hand, the nutritive part of the bones is apt to remain on the surface, and does not so readily mix with the soil as in ground of a freer quality. If previously mixed however, with other manure in compost, it might be advantageously applied, to every species of soil, whether wet or dry, and perhaps, in many cases, might render fallows unnecessary.

5. *On composts with bone.*—It is a circumstance that seems to be well ascertained, and the practice is strongly recommended by the Doncaster Association,† that a compost of bones, with dung, or other substances, is superior to bones used singly. Various substances have been employed for that purpose, as six loads of farm-yard manure, to ten bushels of bone-dust—a quantity of ashes from house fires moistened with urine—five loads of burnt clay, or good earth, mixed with fifty bushels of bones—a compost of soot, rape-dust, red ashes from burnt weeds, &c.

This circumstance merits particular attention, for bones in wet weather do not act, whereas if composts are applied with bones, some of the articles employed will operate; and when the land becomes dry, the bones will probably take effect, and the crop will hardly fail in any season. When employed in compost also, the manure may be more equally spread, and more confidently relied on.

Captain Barclay uses a mixture of bone-dust, and farm-yard manure, in the proportion of ten loads of farm-yard manure, to fifteen bushels of bone-dust *per* Scotch acre. He puts the land in ridges in the usual style, with the dung in the centre, and the bone dust is sown with the turnip seed, by a drill-machine. Under this excellent system, his crops are never injured by the fly. It is important however, that the dung should be two years old, as it will be less likely to be infested with insects.

Others recommend a dressing of eight cubic yards of ashes, and twenty bushels of crushed bones *per* acre, applying them separately. The ashes would first operate, and the bones would complete the production.

6. *On the various modes of preparing bones.*—Mr. St. Leger, who originally pointed out the advantages of bone manure, was accustomed to mix a cart load of ashes, with thirty to forty bushels of bones. After they had been heated for about twenty-four hours, and begun to smoke, the whole heap was turned, and about ten days after it became fit for use. Others have found, that covering bones with quicklime, is an excellent mode of preparing them for use. As soon as the lime becomes effete the bones are picked out, and though retaining their form, they are easily reduced to powder by a hammer, and in that state, they may be thinly spread by hand, or by a machine.*

Dr. Fenwick of Durham, an eminent agriculturist, has suggested to the author, the adoption of the following plan:—where there is no mill to crush bones within a reasonable distance, after chopping the bones, he recommends spreading them between two layers of earth, near a pond, or other supply of water, and to let the heap thus formed, be kept moist, by occasionally sprinkling it, till the manure be wanted. Fresh soils, thus mixed with bones, and watered, will heat as a dunghill and the bones will be rendered so tender by the process, that they are quickly dissolved. As the whole substance is thus sooner applied to the plants, a smaller quantity at a time will suffice, and thus the first outlay will be diminished. The bones wanted for turnip manure, may be thus prepared, even some months before they are wanted.

But the general mode of preparing bones for use, is by crushing them. Bone mills, for that purpose, erected at an expense of from £100 to £200, are very common in the northern parts of England. They are chiefly in the hands of persons who make a trade of it. They are mostly driven by steam engines of from eight to sixteen horse power. Some machines however, are driven by water, and some by horses; but it requires three relays, of two horses each, to reduce eighty bushels of rough bones *per* day; and farm horses have so much to do, in carrying on the operations of the farm, that they have work enough, without being employed in crushing bones. It is better therefore, that this process should be undertaken by a separate profession.

7. *On the proper size of bone manure for quick profit.*—A decided preference is given to bones broken small, and they are frequently reduced to powder of the size of saw dust. Indeed, the more they are divided the more powerful are their effects. But if it is desired to keep the land *in good heart*, the size should be about half an inch.

When the bones are broken to a small size like dust, twenty-five bushels per statute acre are sufficient, but forty bushels are required, if the size of the bones is from half an inch to an inch.

8. *On fermenting bones.*—It can hardly be doubted, that fermentation is necessary to a speedy benefit from bone manure, for when unfermented, though laid on at the rate of even eighty bushels per statute acre, they have at first little effect on the soil. Hence it is that bones, though in consequence of their being boiled or stewed, and passing through an oil or glue manufactory, have

* Quarterly Journal of Agriculture, p. 52.

† Report, p. 20.

* Oyster shells have been advantageously treated in the same way, and have proved fully equal to bone-dust.

necessarily lost some valuable parts of their substance, *yet having been fermented*, they are preferable to those in a raw state,* the fibres of the turnips, or of any other plant, taking hold of them sooner, after the oleaginous part, which impedes their decomposition, has been taken from them. It is in consequence of their being heated, that bones are rather improved in utility, by their being kept in a great body on board a ship, either when imported from other countries, or conveyed at home from one port to another. Bones however, in a raw state, are superior in point of duration, to those which have undergone any manufacturing process.

9. *On the advantages of bone manure, applied to arable land.*—In the cultivation of arable land, bone manure is generally employed for the turnip crop.

This is productive of numerous advantages; the use of this manure, diminishes labor at the season of the year, when time is of the greatest importance, for one wagon load, containing a hundred and twenty bushels of small bones, fit for the drill, equals from forty to fifty cart loads of fold manure.

Its suitableness for the drill, when converted into dust, and its great fertilizing properties, render it peculiarly valuable in those parts, where from the distance of towns, or large villages, it is impossible to procure manures of a heavier and more bulky description. It is evident, that there can be no seeds of weeds, or larvæ of insects in bone manure, which is generally the case in farm-yard dung.

It is an immense advantage, (if bones are properly used,) that a severe drought will not prevent a crop of turnips, even in seasons, when all other manures will fail. A number of valuable animals are thus preserved from perishing, and manure obtained for the succeeding crops in the rotation.

When bones are used, the farmer is but little troubled with the fly or beetle, so injurious to turnips, for as soon as the plant reaches the bones, they immediately get into the rough leaf, and no fly touches them; whereas with dung, particularly if it is only one year old, the fly is generated, and in dry weather, the continued sunshine matures them, and from want of rain or cool weather to thin them, they come into action in great numbers, and destroy the young plant.† It has also been remarked, that the disorder, called fingers and toes, has been less prevalent since bone-dust has been in use.

Turnips raised by bone-dust, are said to be superior in quality to those produced by any other sort of manure. They also remain quite green, when the same crop, laid down with other dressings, is entirely destroyed. The roots also, are quite of a different quality, being much firmer, and more nutritious, while the succeeding barley ripens earlier, and is increased in quantity. The succeeding crop of clover also, is said to be improved in the same proportion.

In thin sandy soils, with a gravelly subsoil, if rape dust be used, it is often washed away by rain, and in very hot and dry seasons, the strength and virtues of dung are apt to be evaporated. But in all seasons, and under all circumstances, bone manure is found to be productive.

Bone-dust as a manure may, with comparative ease, be applied to lands at a great distance from the homestead, or of difficult access; also in situations where the surface is broken by rocks, or so steep, as to make it difficult to cover dung, (where it is used) in the drills.

Turnips however, produced by bone manure, should be consumed on the ground by sheep, to prepare it for the succeeding crop of corn, as the effect of such a small quantity, cannot be supposed to continue through successive crops; but if any part of the turnips be removed, care should be taken, to clean them well when taken up, otherwise the small particles of bones, which are found invariably adhering to the roots, would be carried off the land.*

It is an immense addition to all these advantages, that when this extraneous manure can be made use of, the dung produced on the farm, not being required for the turnips, can be advantageously applied to the other crops in cultivation.

The following is a comparative statement of the expense of manuring an acre of land with bone-dust, and with dung, allowing forty-five imperial bushels of the former, and thirty tons of the latter, and supposing the distance of the farm, from the place where the manure is supplied, to be five miles.

To 30 tons dung, at the low price of 5s. per ton,	£7 10 0	
Cartage, tolls, &c. for 30 carts, at 2s. 6d. per cart,	3 15 0	
		£11 5 0
To 45 imperial bushels of bone-dust and drill, average price 2s. 8d. per bushel,	£6 0 0	
Cartage, &c., one cart,	0 2 6	
		6 2 6
Additional expense of an acre manured with dung, compared with one manured with bones,		£5 2 6

The above great inferiority of cost, when taken into consideration with the very great difference of labor, and the greater richness and durability of bones as manure, over dung, form a very striking contrast indeed.

10. *On the advantages of Bone Manure applied to grass lands.*—On grass, bones should be sown in the state of powder, in autumn, by the hand, or if the quantity allowed is small, early in the spring;† but previous to its application as a top-dressing, the five coulter cutting plough, or scarificator, should be employed to open the ground. The manure has thus a more speedy influence upon the grasses. There is less waste of it, and its effects are more beneficial and complete, than when it is merely thrown upon the surface, and left to work its own way, without any such assistance. When thus managed, bones have a greater effect on grass lands, than even on arable.‡ The cows

* Doncaster Report, p. 9; also p. 22.

†Doncaster Report, pp. 9 and 10.

* Hints from Mr. Grey of Millfield.

†If bruised bones were used they might interrupt the progress of the scythe.

‡Doncaster Report, p. 14.

pastured on lands thus manured, are so much improved in condition, that they will produce about twice the quantity of butter, than when feeding upon land of similar quality, but not boned; and the pasture, in regard both to quantity and quality, is greatly ameliorated for a number of years. When the field is in hay, the crop is likewise more abundant—the aftergrass more nutritious—and the herbage it produces is so peculiarly sweet, that cattle and sheep will hang upon it, as long as they can find a blade of grass to devour.*

But we are told, that bone manure is an article that may be exhausted, and that a supply cannot be confidently relied on. That idea however, cannot be admitted. Bones might be brought, even in considerable quantities, *in ballast*, from the most distant countries; and from the Brazils, where cattle are so cheap, as to be killed for the sake of their hides alone, the supply would probably be abundant. Besides, there are many other substances, as horns, the shells of sea-fish, coral, and shell marl, which may answer the same purpose, and the produce of which is perfectly inexhaustible. Horns are found to be a more powerful manure than even bones, for they contain a larger quantity of decomposible animal matter, but being much used in various manufactures, their shavings or turnings alone, are applicable to agricultural purposes; and though they form an excellent manure, yet they are not sufficiently abundant to be much used. They are sown by the hand, as a top-dressing for wheat, and other crops.†

Shells of Sea-Fish.—As bones are likely to become rather a scarce article, it may be difficult to supply them in quantities adequate to the demand: it is a most fortunate circumstance therefore, that the shells of oysters and other sea-fish, when properly reduced in size, have been found equally useful as a manure. Their utility would be much increased, if they were sprinkled with sulphuric acid, by the addition of which they would be converted into gypsum.

Shell-Marl.—Among the articles that may be used in aid of bone-dust, there is none better calculated to raise abundant crops of turnips, than shell-marl. It consists of calcareous matter, the broken and partially decayed shells of fresh water fish, found often in morasses, and at the bottom of lakes and ponds. It possesses great stimulating properties, and is highly beneficial in fertilizing the soil. There can be no doubt therefore, that it furnishes the means of producing various crops, and turnips in particular, if employed in the same way as bone-dust, namely, inserting it into the drills, with the turnip seed. There is every reason indeed to hope, that its growth would thus be rendered so rapid, as to prevent the attacks of the fly. The field should be put in drills in the usual style; a moderate quantity of fish manure, or fermented dung, say at the rate of two tons per acre, put in the centre of the drills, and the turnip seed and shell-marl mixed together, sown by a drill machine above the fish or dung.

By this simple process, immense crops of the Swedish, as well as the common turnip, might be obtained; and perhaps that still more valuable plant, the mangold wurtzel, might likewise be successfully cultivated.

*Worgan's Survey of Cornwall, p. 130.

†Davy's Lectures on Agricultural Chemistry, p 253.

The addition which this plan would make, to the value of the counties of Caithness, of Forfar and other districts in Scotland, where shell-marl abounds, is hardly to be credited.

Corals.—If every other substance of a similar quality were to fail, it is a fortunate circumstance, that corals might be obtained in inexhaustible quantities. Banks of them have been found in some of the Western Islands of Scotland, and in the parishes of Southend in Argyleshire, and of Loch Broom in Ross-shire. It is well known that corals are of animal origin, and wherever they have been tried, their effects have been highly gratifying.

Conclusion.

By these important discoveries in the art of agriculture, an end is put, to all the fanciful divisions of our soils, by political economists, into a certain number of zones, according to their supposed fertility. All these zones, by means of these discoveries, may be rendered equally productive. Already, it has been completely ascertained, that, by means of bone-dust, the poorest, coldest, and most humid lands, in various parts of England, have been brought into the highest state of cultivation, and improved in regard to their produce and intenseness of fertility. It can no longer be doubted, that, by means of bones, and the other substances above enumerated, the coldest clay, and poorest heaths, may be rendered productive.

A foreign agriculturist, astonished at the immense exportation of bones from the Continent of England, instituted some comparative experiments, the results of which prove, that bone-dust acts in the cultivation of grain, when compared to the best stable manure,—

1. In respect to the quality of the corn, as 7 to 5
2. In respect to quantity, as 5 to 4
3. In respect to durability of the energy of soils, as 3 to 2

It is a strong argument also, in favor of bone manure, that it is found to benefit, not only the particular crop to which it is applied, but that it extends its influence to the succeeding ones, and that, even in the following courses, its effects are visible, in the improved quality of the soil, and the efficiency of a smaller quantity of bones, than was at first necessary to insure a crop.

It may be proper to conclude this interesting inquiry, with some general remarks on the utility of manures.

It has been justly observed, that all vegetables, naturally incline to that state in which they existed, when sown and produced by the hand of nature, without any artificial aid; and that the great objects of agriculture are, 1. To keep up vegetables in that *unnaturally luxuriant state*, in which they are brought by cultivation; and, 2. To preserve their health, and distinct character and properties, while they are in that state. For these important purposes, the application of manures is necessary. It is not essential however, that the manure applied should, in all cases be sufficient to maintain that unnatural luxuriance of the plant, which it has acquired in the course of its cultivation, for many plants, in particular turnips and potatoes, draw nourishment from the atmosphere as

well as the soil, and consequently do not require the same quantity of manure, as in the case of corn, where the growth of the plant, in a great measure, depends upon the fertility and richness of the soil.*

[The foregoing article is from the Addenda to the last edition of Sinclair's *Code of Agriculture*, and may be supposed to present whatever was known of the valuable properties of bone manure. But there is one objectionable part, which by attempting to prove too much, might, with some well informed readers, weaken the sound testimony of the balance. We refer to the recommendation of pounded oyster shells as a substitute for bones, of equal value. Pounded oyster shells are almost a pure calcareous manure, consisting of carbonate of lime entirely, except a very small portion of gelatinous animal matter. None of our readers will charge us with *underrating* the value of such a manure: but highly as we would estimate it, its chemical composition is altogether different from that of bones—and its action as manure may be supposed to be also quite different—as it certainly is greatly inferior to that of bones, which consist of *phosphate of lime*, combined with a very large proportion of gelatinous or other alimentary animal matter. Sir John Sinclair's agricultural works stand deservedly high: but, as we have elsewhere remarked, so voluminous a writer has been necessarily furnished by others with much the greater part of the matter of his writings—and as a consequence (in some degree perhaps unavoidable) some passages and statements of facts are admitted, which a stricter scrutiny would either have rejected, or so explained as to present quite a different aspect. The author of so many works was necessarily, like the editor of an agricultural journal, principally a compiler and publisher of other men's opinions—but the difference is, that while an editor is responsible for no opinion which he merely publishes, or selects from other journals, the compiling author makes the materials of others his own property—and if his name is high authority, he thus, through want of examination, gives currency and importance to mistakes or false statements.

The idea that "the utility [of sea shells] would be much increased by *sprinkling them with sulphuric acid*, by the addition of which they would be converted to gypsum," is as ridiculous as any practicable scheme of the philosophers of Laputa. In addition to the enormous and unnecessary expense of thus manufacturing gypsum, the result would be to give to the soil a manure entirely different in chemical composition—and which, however valuable in suitable applications, might be useless and wasted, where the shells would be most necessary and profitable.]

* See some ingenious observations, entitled, Remarks on Manures, and on the Action of Ground Bones on Plants, and the Soil. Quarterly Journal of Agriculture, No. 1. p. 43. Mr. Mason of Chilton tried the following experiment: "He applied forty bushels "of bones, broken small, with eighty bushels of burnt "soil, to one acre, and to an acre immediately adjoin-"ing, forty gallons of unrefined whale oil, (which cost "8½d. per gallon,) mixed with one hundred and twen-"ty bushels of screened oil." This last mixture was made one month before it was used. The result was, that the soil and oil gave him at the rate of 23 tons, 5 cwt. 6 st. per acre, while the bones and burnt soil produced 21 tons, 18 cwt. 6 st. per acre, making therefore, a decisive difference, in favor of the fine earth and oil. See the Doncaster Report, p. 30.

The attention of the spirited farmer, to its important experiment, cannot be too strongly recommended, for oil would be a much more accessible species of manure than even bone-dust, and could be had in greater quantities, and at a cheaper rate.

The want of an experimental farm, to try the effect of such experiments as these, is deeply to be lamented. In the interim, it is highly desirable, that *agricultural associations* should endeavor to supply the deficiency, by a diligent inquiry into the practices of different farmers, and a publication of the most important improvements, which they have respectively discovered. This is an advantage, which has not hitherto been obtained to the extent it ought, owing to the attention of the public, not being hitherto sufficiently called to the immediate and extensive advantages which would result from habits of inquiry. Hence, owing to the want of communication and intercourse on practical farming subjects, the improvements adopted by one farmer, are unknown, even among his nearest neighbors. It is next to impossible, that hundreds and even thousands of intelligent men, should be in the practice of directing and superintending agricultural operation, without making some improvements in their method; and it cannot be doubted, that the advantages accruing from the improvements they have discovered, might be made equally available to all other farmers. But unfortunately, from the seclusion connected with a life, entirely devoted to the pursuits of agriculture, individuals are not led, by the great impetus of self-interest, to make their improvements public; on the contrary, they are frequently inclined to conceal them. This great deficiency can best be supplied, by means of agricultural associations making a diligent collection of facts, and communicating them for the public benefit. See the valuable Report of the Doncaster Association, p. 32.

EXTRACTS FROM THE MANUSCRIPT NOTES OF A FARMER.

[Continued from page 539.]

Letter III.

To the Editor of the Farmers' Register.

Holmesburg, Nov. 22, 1835.

I thought you would lecture me about slavery. If I should say any thing which you think might give offence, pray alter it or strike it out—but I have no such wrong and foolish intention. I am no abolitionist. I do not view slavery as a crime, but an error—alike injurious to all future and permanent interests. Doubtless it has great and beneficial effects, otherwise it never would have been permitted to exist. But it is clearly not a permanent institution. If it is viewed as a crime, every one who pays wages below the bread and meat power of subsistence, in the North, in England, Ireland, &c. are much more criminal than the slaveholders in warm climates: because animal food and warm clothing are much more essential to the existence, well-being and comfort of man in the former countries than in the latter. We have sins and errors enough of our own to correct and reform, without crusading amongst our neighbors. If principles and the operations and effects of the observance and non-observance of

the laws of nature, are clearly proved and shown and properly stated; all may be convinced upon all questions in due time, (every one should study geology, and the progress of man as well, to learn how the laws of nature proceed,) without offending and doing injury and injustice to any. I look upon the immediate abolition of slavery in the West Indies as one of the greatest national errors ever committed—but such an event must be for some great purpose. The English are perfectly insane upon this question. Entirely ignorant of direct, immediate, *personal* slavery, they view it as an abstract principle—and totally disregarding all *known* and *unknown* principles of human nature, and of the laws of nature, they abolish their slavery there with the stroke of the pen! It is the second step to the dismemberment of the British empire, which is likewise clearly not a permanent one. Free government, or rather the first principles of it, were first developed in temperate climates,in an island in the middle latitudes of Europe. The germ of free government in the tropics was first established in an island likewise, (Hayti.) Why freedom has first been so established may, I think, be easily. Shown as it proceeds, you will have a difficult task to perform in the south.

You are at liberty to publish all you think fit, unless I request otherwise at the time. You say you do not yet understand my views, or to what school I belong upon political economy. I will state my views upon manufactures, food and population, in connection with agriculture, as I proceed in my communications. I scarcely belong to any school upon any subject. Condy Raguetism, Matthew Careyism and Tappanism, &c. are all wild, impracticable and mischievous errors and extremes of the same class—that is, in the present state of society. If the means and ability to manufacture exist, Matthew Careyism is infinitely better than Condy Raguetism—the latter being altogether an abstract principle, only to be established when man is perfect, and in this I firmly believe—it is easy to prove. The Creator is perfect. Protection I hold to be necessary to enable manufactures to be established—being long established elsewhere—and duties I consider as wise and politic in the present state of the world. Most of our duties are now paid by the foreign producers—formerly, not at all, or very little. I think the United States paid the taxes of others long enough. Coal, for instance, was formerly ten and twelve dollars and more, per ton—now five and six, with a duty of two dollars. Who pays that duty? Certainly not the consumer. So with many other productions—the foreign producer now lowers his prices. If an article is not produced here, and the duty is moderate, it is paid by the consumer—if very high, it is paid by the consumer and foreign producer, as is exactly the case with your tobacco. If that duty was moderate, you would probably obtain 25 to 50 cents per lb. instead of only a few cents. That duty is paid by the producer here, and the consumer in England. If an article is partly produced at home, and partly imported, the foreign producer pays most of the duty—that is, he sells for less than he otherwise would do. If the duty upon tobacco in England was ten cents instead of seventy, (it was eighty cents!) the producer here would receive more, and the consumer there would pay less than they now do. If there was a duty of 20 cents upon cotton in England, the planter would only get about five cents, as he does for tobacco.

I never could understand why the South so furiously and vehemently supported the monopoly of England! It should have said to the North, "if you are ready and able to begin manufacturing, we will help and support you to break that monopoly, and God speed you—for monopolists always sell dear and buy cheap." With two or more markets, we shall get more for our raw materials, and pay less for the goods, which is now the case, as I always predicted. England had the monopoly of the world, and well she has made it pay! The United States has now a surplus revenue of near twenty millions, and no body knows where it came from! and there might have been near twice as much obtained as easily.

Before the Erie Canal was made, most of the northern store cattle came here. We paid from fifteen to thirty dollars ahead. After it was finished, they were chiefly fed and killed at home, and they rose to twenty-five and forty dollars, and beef fell two and three dollars per cwt.—the latter now rising again from the great increasing demand. Facts are stubborn things.

When Congress took off the duty upon coffee, Ferdinand VII. laid it on as an export duty at the Havana, with an import duty of six or eight dollars on flour! Condy Raguetism will not do yet—and Jonathan is not always as sharp-sighted as he might be.

You seem to wish me to write more about *direct practical* agriculture. I thought it better to say something first as to what the true principles of agriculture are, and what is required for their establishment and existence—besides I wish to see a little more of the results of my present crops, for it is only lately I began my present practice. The promise is such as I never saw before. I am confident I am right—but we must never halloo too soon—a small error or failure under new circumstances, no matter from what cause, is enough.

In 1833 I top-dressed a grass field in the fall. Its condition was good. 1834—mowed it, ploughed immediately—six weeks after sowed ruta baga without manure. Such a crop I never had,or ever saw, and I have seen thousands of acres. The extremity of the leaves measured 11 feet in circumference: they looked like the rank vegetation upon the banks of rivers. How often I looked at them! the feelings I would not exchange for any man's. 1835—Barley and down again with grass for three years. The barley was superb—not yet thrashed. One of my pupils who returned from England this summer, said he saw none so good there: an Englishman said the same. I intended top-dressing it again this fall, but the grass is so luxuriant I thought it better not to do so. I have just lightly limed and plastered it. Oh! but it is a glorious system—and it costs nothing.

GEORGE HENRY WALKER.

Holmesburg, January 12th, 1836.

Letter IV.

You still appear (by your letter of Dec. 11th,) to be the most desirous about *practical* operations. Now, farmers are not in much repute amongst

other "learned" and "polite" professions, and consequently, not so with each other: when this is the case, is not a little mystery and delay the best?—better not to tell all at once—excite the curiosity—endeavor to state the *true* principles of agriculture *first*—then people will say, "I did not think of this before—this is a sensible fellow—I should like to know what his practice is, and *more* of the results." We are thought too meanly of, and we think too meanly of ourselves; that is, of our profession—its value and importance. The remarks of Col. Bondurant upon this subject, in your December No. are excellent. I want to say something about this in my notes upon Brooks' letter from London, and about the true principles of agriculture—and we can poke in a little *practice* as we go along. Practice, by itself, is like recipes, prescriptions, good advice, &c. in the newspapers—soon forgotten, and little attended to.

Don't be afraid of some of my heterodox opinions: they will come in, and tell by and by; for I have a strong hold against, at present, high established authorities. *Between ourselves*, I have made the greatest and most important discovery ever made by man; this is in agriculture, and in political economy, as regards food and population. It is of no use to myself and society to tell this *publicly*, all at once. I am perfectly confident in the truth of my positions. I call my practice the anti-Malthusian system of agriculture.* A word about it. Do you not see that man has never yet lived according to the *natural* law of his subsistence—which is, according to his organization; that Malthus and his followers never thought of ascertaining what this law is, and the corresponding law of agriculture!!!—and hence all their errors. Do you not see that man has hitherto deemed it of no importance whether nations subsist upon bread, potatoes, rice, or Indian corn, &c., with little or no animal food; and hence the utter exhaustion of the soil; because vegetable matter, (grass, roots, &c.) and animal manure (with calcareous matter as the governing power, in duly proportioning stalk, leaf, fruit, grain and seed—) have, under these circumstances, been almost wholly wanting; and hence the "decline and fall" of Rome, (and all other empires,) with accomplishing which, Cæsar had no more to do than Gen. Jackson had. Individuals have no such power as *that*, either for good or evil—particularly the latter. The fall and permanence of nations depend upon the non-observance and observance of the laws of nature, by the *mass* of the people—not upon the acts of individuals.

I consider that man was formed to subsist upon animal and vegetable food, in certain proportions; the proportion of animal food increasing with decrease of temperature—obviously for the wisest and best purposes; and that the true principles of agriculture are conformable to this law of subsis-

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* The theory of Malthus of the laws of population and subsistence, may not be familiar to all who will read the remarks of our correspondent—and therefore we may be pardoned for presenting the following concise statement in explanation.

The doctrine of Malthus, (which has obtained the assent of almost all political economists,) is, that population naturally increases in a geometrical ratio, while food can only be increased in an arithmetical ratio. Suppose that marriages on an average produce 4 children, who may themselves live to marry: then each generation will serve to double the population, according to the ratio of 1, 2, 4, 8, 16, 32, &c. Let the rate of increase be ever so much slower, it is still in a geometrical ratio, and, in a longer time, will produce similar results.

In a country thus increasing in population, the quantity of food, or means of subsistence, will of course be increased also—but however rapidly, it will not be in geometrical, but in arithmetical proportion—not by doubling—but by regular additions of equal (or more often of decreasing) quantities. Thus food may increase at first, (and generally will, in new and fertile countries,) even faster than population—as in the ratio of 1 to 4, (or by additions of 3)—but then it will be only at the rate of 1, 4, 7, 10, 13, 16—and of course the increase of population will be rapidly overtaking, and then outstripping the means for its support.

The rule, however, can only work freely and fully so long as there are no checks obstructing propagation—and there is no country, no condition of man, in which such checks do not operate with more or less force. *Perhaps they have less influence on the slave population of most of the southern states, than on any other class in the world.* The checks are either *prudential*, *moral*, or *physical*—the latter being the state of starvation and other extreme suffering following want of food. The first two checks to population serve to restrain the natural tendency to propagation—and if *they* are not exerted, the *last one* serves effectually to destroy the redundant increase and to reduce population within the limits fixed by the amount of subsistence then furnished by the industry and products of the country.

The inferences are—that the most prosperous and fertile country, with the best regulated society, contains the seeds which will surely produce an abundant harvest of misery. There is no effectual remedy—and the only hope for mitigating the weight of these approaching inflictions, is the rigid enforcement of the operation of the three checks to population. This stern, repulsive, and stubborn doctrine, wars with the strongest as well as the most generous natural impulses of the human race, and even forbids the exercise of acts of charity, by continually warning us that in giving present aid and comfort, we are producing a ten-fold amount of future misery. We have not read Malthus for nearly twenty years—and now state his views, and our own inferences from recollection—but the lapse of time has not lessened our submission to his reasoning. Though we doubt the ability of our correspondent, and of all other persons, to show the theory of population to be false, we heartily wish him success, and should be rejoiced to yield to his arguments our present unwilling conviction of the truth of the heart-benumbing, hope-stifling doctrine of Malthus. Ed. Farm. Reg.

tence, and that this law of subsistence is conformable to the true principles of agriculture. England, and the United States still more, have observed those laws the best, and hence their prosperity and advancement above all other nations. How strange the political economists have never studied this part of the question! They have never yet even thought of it!!

I have endeavored to form my system of farming upon those principles. I told you of my superb crop of turnips without manure—after grass, top-dressed the year before. The barley after them last year (without manure,) will be 50 bushels per acre, if not more, (not quite all thrashed yet,) and a fine sample. I intended to top-dress the grass, in the barley stubble, last fall, but it appeared too rich, and I put the manure upon a poorer stubble. A few years ago this land would not grow more than five bushels of barley per acre, of the worst quality. The field was three years in grass previous to the turnips (ruta baga). With this system, deficiency of food and excess of population is an idle fear. The first year I mowed six wagon loads of hay per acre; the second, four loads; the third, top-dressed, three loads. It ought to have been top-dressed the first year. Manuring old grass is of little service to the coming crop; it is like trying to renovate the youth of an old man. But it is of great benefit to the succeeding arable crop.

As grass and arable cattle crops are duly proportioned to, and alternated with grain and other crops for man, according to the natural law of his subsistence, so will the fertility of the soil be the greatest, and the labor the least, leaving the *mass* of the population for manufactures and commerce, and all other professions. The practice of mankind has hitherto been perpetual tillage, with separate or little or no grass; or grass very partially attended with arable crops; or arable cattle crops and some grass, occasionally alternated with arable crops for man; with separate permanent pasture and meadow, as in England. Hence utter exhaustion of the soil—partial improvement, and stationary medium fertility; and hence under these circumstances, more or less deficiency of food, and excess of population; and hence again, under these circumstances, the full truth of the Malthusian theory. But Malthus evidently knew not why or wherefore, nor how to remedy the evils and errors, but by *breaking a third law of nature!* —for of the *natural* law of subsistence and of the corresponding true principles of agriculture, he knew nothing—nor even thought of them. Had he investigated them, and studied how far they had been observed, and how much they have been broken, neglected, and unduly observed, he might have been led to infer far greater perfection, wisdom, goodness, beauty and harmony in the laws of the supreme and all-wise Creator, than his sad and disheartening theory implies. There are the means of subsistence for *all*, if the laws of nature are duly observed by *all*. I should be sorry to believe it otherwise. To regulate the numbers of mankind is no part of the prerogatives of man. This can only be in the hands of that power which created him. But Malthus has opened the door to the truth, and that is a great deal. His theory, with other circumstances, and a knowledge of the condition of the people of England and the United States, led me to the discovery of what I am quite confident is the real truth in this greatest and most important of all questions, affecting the condition, well-being, happiness, and civilization of man.

GEORGE HENRY WALKER.

From the Southern Agriculturist.

ON MANURES.

Report of the Committee on agricultural subjects, to the Society for the advancement of learning in South Carolina.

Gentlemen—Having been honored by your choice to present to you some agricultural subjects which may be interesting and advantageous to our state, we must, notwithstanding the inadequacy of our knowledge and experience, to do justice to so copious a theme, exert our feeble powers. Relying on your indulgence, we hope to take such views of the subject as may enable you to glean a few ears from among the stubble.

Although agriculture is the most ancient, and the most honorable, because the most useful and necessary profession, it is, as a science, as yet, in a surprising state of imperfection. It has always added to the glory of the states which have given it encouragement, and when skilfully conducted, has ever proven a source of individual wealth and national power. We cannot, therefore, bestow upon it too much of our care, nor seek with too much zeal the surest modes of securing the incalculable benefits to be obtained from it. Indisputable as these propositions are, it is a strange anomaly in human affairs, that this, most necessary wealth, and power-giving art has never had a regular footing in the schools of the ancient or modern world, there to be taught with the other arts and sciences which have given to man so much cause to be proud of the efforts of his reason and of the flights of his genius. Is it because, it is the most easy and least intricate vocation? The most superficial observers only can look upon it in that light. It is very true that the industrious man, though guided by ignorance, is generally enabled to make a support, and even, in some cases, to acquire affluence; but we must also admit that his exertions are most bewildered, and his success most limited, when a difficulty arises that baffles the routine of his operations.

The knowledge required to form a competent agriculturist, is as profound as it is various. So great is the amount and multiplicity of that knowledge, that we may well doubt the practicability of its ever being all possessed by one individual, be his talents, industry and opportunities ever so great. Every branch of science or of art is directly or indirectly connected with rural affairs. We shall not make the vain effort to enumerate them, we shall only point out a few of the nearest, such as mathematics, natural philosophy, botany and the physiology of plants, and the philosophy of vegetation. Chemistry is also indispensable; for it is in various ways intimately connected with agriculture.

The first principles, however, to which we must confine our labors for the present, include the knowledge of the different kinds of soils, and the adaptation of each to every particular object of culture.

Fertility depends on various circumstances; for,

not only the upper stratum of the soil must be compounded of the proper earths and other substances necessary to constitute a good soil, but the subsoil also must have properties to correspond with the upper. A few inches of the very best soil would be of little avail over a stratum of impermeable clay, or over a thick bed of pure sand or gravel. The former could not afford room for the extension of the roots of plants, and it would retain too much water which would stagnate and destroy vegetation, while the latter would suffer all the water to sink and leave the surface too dry for the desired purposes. It is frequently impossible to remedy the defects of the subsoil; but, when it is feasible, the upper stratum may be improved by adding to it such substances of which it may be deficient, even to the degree of bringing a very steril soil to a high state of durable fertility. Indeed, we can see no reason why such soils should not, by proper means within our power, be brought to the very highest state of fertility to which land has ever reached in any part of the world. Land, at the north, has been made to yield upwards of 170 bushels of corn to the acre, which land was probably not originally of the highest grade. We have the same means of improving our land as the people of the north, and we have a more sure climate in our favor. Can any one show that it is impossible to make much of our land equal to the best of Alabama? We think it not only possible, but practicable. In order to do this, however, we should know the constituent parts of those richest soils, so as to know how to form one, the most requisite for fertility.

Many of the arts, assisted by science, have been in our day, carried to such perfection, that he who should, only a few years back, have ventured to predict that which we now witness, would have been thought a fit subject for a lunatic asylum. Agriculture is, at the present time, in the state that some of the improved arts alluded to, were a century ago, and no man would now dare to predict what wonders may be achieved in this department, if proper means be adopted and prosecuted with zeal. We venture to assert, that there is not one object of the pursuits of man, more deserving the use of these proper means, and of the most zealous perseverance than agriculture. This is true, with very few exceptions, in every part of the world; how much more then is it of a country like this which is essentially and exclusively dependent on the produce of the soil. This is emphatically true of the south-eastern states. Depend upon it, not only your prosperity, but your independence, nay, probably, your very existence rest on the exertions now recommended. We shall not say, gentlemen, for your own sake, but for the sake of your wives, children and their posterity, and for your own posthumous fame—reflect on this, and act promptly.

Arable soils are composed of silicious, aluminous and calcareous earth, to which may be added the magnesian. This last is most frequently absent, and its use, as a component part, is not yet well ascertained. It is supposed not necessary to the formation of a fertile soil. The other earths in due proportions, with a suitable quantity of vegetable and animal matters, or putrescent manures, form the richest soils known to agriculture. Either of them, by itself, is perfectly inert and steril. The first, viz. *sand*, is usually, if not always the most abundant in all cultivated soils, even in those denominated aluminous or clay soils. The third, viz. *calcareous earth*, which is most generally in the form of carbonate of lime, is the least in the component parts of fertile soils. Silicious and aluminous earths are never absent in cultivated land; but calcareous earth is frequently so, at least in a perceptible degree. Without it, however, no soil is naturally or can be made by art permanently fertile; for although putrescent manures exert their fertilizing powers, when no calcareous earth is present, their beneficial effects are comparatively evanescent. We have said that neither of these constituent earths, by itself, is otherwise than perfectly steril. We have sufficient proofs of it in the chalks of Europe, and the bald prairies of our western country, as regards the calcareous earth; and we need not point to examples of pure sand, or pure clay to prove our assertion.

From what proceeds, it is evident, that when it is desired to ascertain the qualities of a soil, it is best done by analysis, by which alone the proportion of each of its component parts can be ascertained. If it be found that one of the necessary earths is wanting, or is insufficient in quantity, such a soil can only be rendered fertile by supplying the deficiency. We have said that of the three principal earths, the calcareous is the most frequently deficient, and this is unfortunately the case in a great portion of this state. But although it is most often found wanting in the upper soils, we are not left quite destitute of resources; for, in a considerable section of the country, all below the falls of the rivers, rich and extensive beds of carbonate of lime, in the shape of fossil shells, are to be found a few feet below the surface, and these can supply the deficiency. By means of these very extensive strata of shells, immense tracts of land in the low country, which are now abandoned as exhausted, can be, not only restored to their primitive state, but also be brought to a state of fertility far above that which they ever possessed. It cannot be denied that to perform this requires much labor—and your committee do not pretend to free you from the original sentence passed upon us: "In the sweat of thy face shalt thou eat bread." The question then is, is it worth while to undertake such a great work at the cost of so much labor?—or is it not better to abandon our impoverished state and seek fertility in the western wilds? Too many, far too many have already taken the latter alternative, and the population and wealth of our dear state are far removing to the west. If this system of emigration is persevered in, we ask, in dread of the answer—we ask, with the feelings of men exposed to the most imminent danger, what is to become of the state—the glorious, the hospitable, the chivalric state of South Carolina? We wait not for an answer—but we bid, or rather pray you to turn your eyes towards Italy, to the *Compania di Romana;* to the former mistress of the world herself, and there the answer is most solemnly written in most distinct characters. That country, once the garden and pride of the world—the dwelling place of its masters—where is all its glory? Gone, gone forever. The palaces and gardens of the Cæsars, and of all the great names which are yet the pride of history, are all replaced by infectious marshes, where nothing but desolation, misery and death

can abide. Say not, gentlemen, that we exaggerate the prospect before us; that, at all events, such a condition is far from us. We hope it is very distant, and pray that the similitude may never be realized. But where are now the elegant abodes of hospitality, those palaces that, not many years since adorned the avenues to the good city of Charleston for many miles? There is scarcely any thing left of them except the magnificent lines of live oaks that led to them. These now act as the *ignis fatuus*, and entice the stranger in the hopes of finding the hospitality which seem promised at their termination, when he finds a void, if not a dangerous morass. The great cause of the calamitous change that has thus taken place in Italy, is the neglect of agriculture, by which the fair fields of productiveness became noxious and dismal morasses, yielding the deadly malaria, instead of the rich harvests of corn and luxurious gardens. You will say: 'but the Goths and Vandals came and ravaged that country, and began, what sloth and luxury finished.' True, they did come; but are we not also threatened with the Goths and Vandals? Shall we, like the Romans, suffer sloth and luxury to cause our ruin?

The efforts of the southern states should be directed to the encouragement of a middle class of population, and let every avenue be opened for this class to take rank with the first. For this purpose, education should be promoted by every possible means, and no reasonable expense spared to attain this most valuable object; for it is the moral power of a state, as agriculture is its physical one. For this reason, the advancement of learning and the most durable amelioration of the soil, should be the great objects of our unremitted efforts. By these means only can we ever be powerful and retain our present property, nay, our independence. This, we are satisfied, cannot be done without the fullest co-operation of our richer and more intelligent class of citizens. Even though the immediate and direct improvement of this class should not follow such efforts, yet the trial should be made. Advance rural science, and every inhabitant will be benefited; for there is really only one prominent interest in this state, and that is agriculture. The others are all dependent upon it. It appears to us, gentlemen, that the administration, or rather the constitution of our state government, is defective in its arrangements; and we throw out the hint, that it may be duly considered. It seems to us that every department of our interest should have a competent officer at its head. In our financial department, we have a comptroller and a treasurer. Why should we not have a minister of instruction and one of agriculture? These two most essential officers, if well chosen, would undoubtedly superintend their respective departments to the great advantage of the state.

We need principally knowledge and population, and from any degree of increase of them, a proportional increase of wealth is the necessary consequence. With these, and the exertions we are capable of, we could defy the worst efforts of our enemies, and rise triumphant from the conflict. By industriously spreading knowledge among our planters and farmers, we shall so increase the fertility of our soil, that our citizens will cease to look westwardly for rich lands, and patriotism, aided by self-interest, will save the country.

The first stage towards the accomplishment of this most desirable object is the inquiry, 1st. Whether our soil needs, and is generally susceptible of the improvement possessed. 2d. Whether we really possess the materials to effect it; and 3d. Whether these materials are to be obtained generally, at such a moderate expense, as to warrant the undertaking.

To answer the first query, to the satisfaction of reasonable men, we must show—that it has been done on similar lands in other countries. This we shall endeavor to do very briefly. The very few scientific examinations and analyses of our various soils, leave us but a narrow field for our research; but, by a comparison of the soils of this state with those in similar situations below the falls of the rivers in Virginia, Maryland, and other states, where the soils have been analyzed, we are warranted in asserting that they are similar—and in the two states named, such lands have been vastly improved by the means here proposed; for they were generally found deficient in calcareous earth, except in extensive beds of shells below the surface. Our worn-out fields may also be deficient in vegetable matter; but this is so easily supplied from the leaves of our forests, the inexhaustible beds of vegetable earth in our swamps, along the margin of all our water courses, from the spring branch to the largest river or bay. It may also be had in such abundance from every pond, and the steep sides and bottoms of every rising ground, that we may say that every man has at hand the means of supplying this deficiency. It is somewhat different, however, with the supplies of calcareous matter. But this is the object of the second query.

The immediate vicinity of the sea has the advantage, besides sea-coze and sedge, of fresh shells, which may either be pulverized by burning, or which would be far more beneficial, though, perhaps, more expensive, by being coarsely ground immediately before they are spread on the land and ploughed in. By the process of burning, all the animal matter of the shell and of the animal it contained, are lost, and the lime thus produced, is, perhaps, not so generally fit for all kinds of land as the other, unless it is exposed a long time to the air to regain the carbonic acid of which the fire has deprived it. Lime in a caustic state, however, is sometimes preferable to the carbonate; as when it is to be applied to land overburdened with coarse vegetable matter, as is the case with land uncleared or which has just been cleared. For all the other lands, the chief dependence is on the great deposites of fossil shells, which are visible on the surface, in some places, and in others on the banks of rivers, creeks, gulleys, and such other places. Great strata of them are known to exist from the sea-board up to Orangeburg, or above, in the direction of Columbia. When we shall be fully impressed with the immense value of these deposites, and search for them, many localities of them will undoubtedly be found in favorable situations. Wherever they have been used in similar situations as the tract of country in contemplation, most of these beds of shells have been found inexhaustible. Parts of the upper country is abundantly supplied with calcareous matter in its

marbles and lime stones. The materials are then to be had in abundance.

To answer the third query, we must inquire into what has been done in other countries or states, and what is usually the expense.

We have, on this subject, the undoubted testimony of almost every European writer on agriculture. In those countries, carbonate of lime, in the form and by the name of marl, has been used to restore fertility to land from time immemorial. Lime, in a caustic state, has also been much used for the same purpose, and when applied with judgement, the result has always been satisfactory. Sir H. Davy says, (p. 182,) in his Agricultural Chemistry: "The labour of improving the texture or the constitution of the soil, is repaid by a great permanent advantage, less manure is required, and its fertility insured; and capital laid out in this way, *secures forever, the productiveness, and consequently the value of the land.*" Also, in another place, (p. 164:) "The soils which contain the most alumina and carbonate of lime, are those which act with the greatest energy in preserving manures. Such soils merit the appellation which is commonly given to them of rich soils; for the vegetable nourishment is long preserved in them, unless taken up by the organs of the plants." James Anderson, L. L. D. in his Essays relating to Agriculture, &c. says, (p. 169:) "Lime is the most universal manure for unproductive land. Of all the manures that can be obtained for improving waste lands, nothing is equal to lime, or other calcareous matter." And in p. 198: "I scruple not again to repeat, for it cannot be too strongly inculcated, that lime, or other calcareous matter, applied in large quantities, must form the basis of all radical improvements of waste lands. Lime tends to sweeten the grasses, produced on every soil, to which it has been applied, so as to render them more palatable to all animals; it augments the quantum of the produce considerably; it thus renders the ground capable of sustaining a greater number of beasts. These, of course, produce more dung, and that dung if applied in conjunction with the lime, will produce greater and more lasting effects than it could have done without it. It would seem that heaven with a view to reward the industry of man, and to set no limits to the melioration of the soil, had disposed this universal fertilizer over our globe, as to bring it within our reach, by the exertions of human industry, almost every where. Whatever, therefore tends to facilitate the acquisition of this manure to any particular place; whether by means of roads, canals, or any other device, must be considered as amongst the most useful of human exertions."

The quotations, from these two writers must suffice, although numerous others, both from Great Britain and the continent, might be advantageously added, were it not for the fear of rendering this memoir much too voluminous. We cannot, however, refrain noticing something of this kind of improvement, that has been lately, and is now going on in increasing progress in some of our sister states, principally in Virginia. That most interesting work, lately published by Mr. Edmund Ruffin, of Virginia, entitled an "Essay on Calcareous Manures," second edition, together with his most invaluable monthly periodical, the "Farmers' Register," (publications which ought to be in the hands of every planter or farmer that can read) have already produced in the short space of little more than two years, very great improvements in the state of Virginia. These works give such undoubted proofs of an increased zeal, in the planters and farmers of that country, as redounds, not only to their honor, but also greatly to their profits. Wherever it is found practicable, the beds of fossil shells, are sought for, and transported on the worn-out or even on fresh lands, at an expense which may appear great in this country, where we are unused to such exertions, but in reality small when compared to the great increase of the crops. By means of these calcareous materials, fields which formerly produced eight or ten bushels of corn to the acre, and other grains in the same proportion, produce now thirty or more, and the land is thereby made fit for the production of wheat and clover, followed by another crop of corn or cotton. We cannot here enter into details, although they are most interesting; but we should not be doing justice to our subject or to our country, were we to neglect the mention of another very great advantage which is found to be derived from the same application of calcareous earths to the land, and that is, that the health of the country has been considerably improved by it. The short time that this invaluable manure has been used in the low country in Virginia and Maryland, does not only afford the most positive evidence of the permanence of this last mentioned benefit, but, from analogy, we are warranted in our hopes of the most permanent advantages from it.* The city of Mobile, from being some years ago, a very sickly place, is now, and has been for a few years, a most healthy one. This is chiefly to be attributed to the paving of its streets with shells, and the filling up of the sunken and marshy places, and covering them with the same materials.

The use of lime in its caustic state for the purpose of disinfecting cemeteries, butcher-pens, &c. has been known from time immemorial; but that these great benefits could be extended over a large extent of country, seems a discovery that had been reserved for our own times. It is found that the carbonate of lime possesses this disinfecting power in at least as high a degree, and is preferable to the caustic lime, except when it is desirable to consume the noxious, putrescent matter. The greater cheapness of the carbonate may render it useful with that view alone; and may be used to cover battle-fields, which besides the butcheries they have witnessed, frequently produce diseases in the country around. It is some-

*It is with sorrow and shame that we offer to correct the mistake which the author of the report has fallen into, and which has caused him to extend general eulogy where it is so little deserved. It is perfectly true that all the beneficial results of the use of marl spoken of above, have been obtained, and to the fullest extent, by many individuals in both Virginia and Maryland. But it must also be admitted that a far greater number in both these states, and still more in North Carolina, who possess equal means for availing themselves of this source of fertility and wealth, have either neglected it entirely, or used it very partially. Ed. Far. Reg.

what singular, that this most interesting fact was discovered in Europe, about the same time, that it was announced here, by Mr. Edmund Ruffin, as we find at the very moment we are writing this, in his Farmer's Register for November.

An obvious question here intrudes itself. Can this be true? Has lime either caustic, or as a carbonate, the wonderful effect of destroying the effluvia of putrefying vegetable or animal matters, which are considered as the greatest cause of bilious diseases? We then ask emphatically: is it true that lime is used effectually, in preventing the bad smells arising from offensive places, from the receptacles of filth—has it not for centuries been the practice of throwing lime over the corpses that were buried in churches to prevent infection? Can we doubt the fact related by Mr. Ruffin, in his "Essay on Calcareous Manures," of an experiment which he has made, of covering the carcass of a cow, which had died in hot weather, with calcareous earth or fossil shells, by which all offensive smell was prevented, and all the gases produced by the putrefaction of the carcass, were evidently absorbed by the carbonate? Can we doubt the experience of ages on a point connected with this subject? If all this be true, it must necessarily follow, that the same means used on an extended scale must produce a commensurate effect. Now that we have a clue to guide us in our reasoning, may we not fairly attribute the well known healthiness of the town of St. Augustine, to the same cause. A considerable part of its vicinity is covered with shells, its houses are formed of a stone which is composed of small shells, and its streets are paved with the same materials.

Persons who have not extended their views on this subject, far and near, can scarcely have an idea of the vast and multifarious advantages, that can be derived from a plentiful use of calcareous matters in agriculture. It is well known that many valuable plants grow thriftily, only on soils either naturally calcareous or artificially made so. Among them we shall only notice such plants as bear papilionacious flowers. Of this class are lucern, clover, &c. It is frequently asked why these two most valuable plants will not thrive in this state. The fault has been sometimes attributed to the great heat of our summers, to the long droughts which frequently occur here, when these plants are parched and killed. It is most probable that the true answer would be, that our soil is too deficient in calcareous matter. The temperature of the state of Virginia, at an equal distance from the sea differs very little from that of our state; and clover grows well there in suitable soils. It is, moreover, most positively ascertained, that calcareous lands are much less affected by droughts, or by too much rain than others. It seems, then, most probable, that we have it in our power to cultivate here these two grasses, and have our clover fields as well as our neighbors; from which they derive almost incredible benefits. By means of clover, they are most undoubtedly enabled to enrich their lands, to any extent they please, according to their industry and intelligence. After clover, cotton, corn, or any other grain, grows admirably well. These advantages are truly incalculably, and they are, at least, to a certain, if not, to the fullest extent, most unquestionably within our reach. We need but will it, and put our shoulder to the wheel, and we are in the enjoyment of them.

It is certainly with exceeding regret that we feel ourselves compelled to exhibit the state of our agriculture in such an unfavorable light; but the truth must be told. We are most fortunately, at present, in a state of peace; and therefore, of prosperity; but we act as if this state of things could not possibly ever be changed. With an abundance of fertile soil, we are dependent on others for our bread and meat, as also for our riding and carriage horses and working mules. If our ports were now to be blockaded by an enemy, we should be in a sad predicament, without either bread or meat in the state sufficient for its own support. It is true, that our neighbors would furnish us with these articles of first necessity; but it could only be at such prices as would make both the rich and the poor suffer. This should not be.

Respectfully submitted by

N. HERBEMONT,
Chairman of the Committee on Agriculture.

ROCKBRIDGE AGRICULTURAL SOCIETY—SILK CULTURE—INTERNAL IMPROVEMENTS OF VIRGINIA.

To the Editor of the Farmers' Register.

Rockbridge Co. Dec. 28, 1835.

* * * * * Like every thing of the kind in Virginia, our Aricultural Society drags on a feeble existence. But under the auspices of its present officers we hope to revive into usefulness. Though the exhibition of stock at our last meeting, was not very creditable, that of domestic manufactures was highly so, particularly the Venetian carpeting, counterpanes, and table linen. A few dozen skeins of beautiful domestic sewing silk, were also exhibited by Miss McClure, of this neighborhood, of various colors, and all of native origin. There cannot be a doubt that our climate and soil are perfectly adapted to the growth of the mulberry, and the rearing of the silk worm. And if the delicate and feeble portion of our population could be induced to turn their attention to the silk culture, and that of the grape vine, a new source of wealth would soon be opened, and the temptations to encounter the pestilence and the privations attending a removal to the far west, greatly diminished, if not entirely removed. This is a result ardently to be desired by every friend to the ancient dominion; and I doubt whether in addition to a more energetic system of internal improvement, it would not be good policy to extend legislative aid to this new source of wealth in the shape of premiums, or otherwise. By the by, what has our Committee on Agriculture in the legislature, been doing for the last few years, to advance the cause? Would it not be well to call their attention to this subject?

There seems to be a growing disposition in the lower country to start a rival improvement (in a rail road from Richmond to Lynchburg) to that of the James River Canal. Can it be possible they seriously contemplate doing the stockholders of that company such injustice? But it would be impolitic, as unjust, because, with the present resources of the state both cannot be carried on with zeal and energy, and it would probably be after half our population had moved off in despair, that either would be brought into a feeble exist-

ence. If the original design was to tap the Valley, and afford a cheap and sufficiently speedy conveyance for the immense resources of this, and the country west of us, no scheme could be devised more likely to effect this than the one contemplated by a continuous canal to Covington—or if the funds of the company are insufficient, to Buchanun at least. And many cogent reasons could be given, why this last named point should be the *terminus* of the great Nashville rail road. I will merely remark, that such articles as plaster, salt, coal, marble, lime, and perhaps limestone and granite, and pig metal, will not very well suffer transportation any great distance on rail roads, and there is no point where the salt and plaster of Washington and Smythe, could strike the James River improvement so cheaply, or at so short a distance, as at Buchanan.

Whilst on this subject, I am reminded to beg your aid to a turnpike we have in contemplation from the present termination of the Lynchburg turnpike at the head of the Blue Ridge canal, by the way of the Natural Bridge and Dibrell's Sulphur Spring to intersect the Covington turnpike at Clifton Forge, on Jackson River. This will afford all from the lower country desirous to visit the mineral springs of the west, by far the most direct, romantic and picturesque road—and indeed, on every account, the most eligible road that can be selected.

ROBERT R. BARTON.

From Chaptal's Chemistry Applied to Agriculture.

OF THE EFFECTS OF THE NOURISHMENT OF PLANTS UPON THE SOIL.

It appears to be clearly proved, that plants imbibe from water and the atmosphere, only carbon, oxygen, and hydrogen; but analysis shows us that, independently of these principles and the products arising from their combinations, plants contain azote and some earthy and saline substances, which cannot be produced by either of the three elements mentioned above. It remains then for us to inquire, in what manner these substances have been introduced into plants.

Azote, which is found in the albumen, the gelatine, and the green coloring matter, is not sensibly drawn from the atmosphere, though it constitutes four-fifths of it, but passes in with oxygen in the water imbibed by plants, and like that, is separated in their organs.

The earths which are insoluble in water, but which are mixed with, or suspended in that fluid, are not absorbed in large quantities by the pores of plants but may be conveyed into them by the aid of some chemical agents, as the acids, the alkalies, &c. Besides, if we observe attentively, we shall find that these substances do not abound in plants; and we can easily conceive, that the little they do contain, might, in a state of extreme division, be introduced by water.

There are some plants that fasten themselves and grow upon the most barren rocks, deriving from the surrounding air, and from rains, all the nourishment required by them; of this number are the mosses, the lichens, and fleshy plants. Their growth is slow, their transportation almost nothing, and their color remains nearly the same all the year round: so that they constantly absorb water and carbonic acid, and assimilate their constituent principles.

The soil is always exhausted, in a greater or less degree, by the plants it produces; and much more by those that are annual, than by those that are perennial. Air and water alone do not afford a sufficient degree of nourishment to plants, for when they have been made to grow in well washed sand, watered with distilled water, though they have flowered, their fruits did not arrive at maturity. Experiments to this effect have been made by Messrs. Giobert, Hassenfratz, de Saussure, &c.

Those annual plants which transpire most, generally exhaust the soil in the greatest degree. Peas, beans, and buckwheat, though they have succulent stalks, exhaust it least, because they transpire but little.

When annual plants are cut at the time of flowering, they do not exhaust the soil, as their succulent roots furnish materials for replacing the loss occasioned by their growth; but after having produced their fruits, the soil derives but little advantage from the dry fibres which are the only remains of their stalks and roots.

During fructification, plants absorb but little nourishment from the soil; the supply necessary to the formation of the seed is furnished by those juices which already exist in the roots and stalks, and this occasions them to become dry and exhausted, so that, when the fruit is perfected, the roots and stalks consist only of wooddy fibres. It is necessary that this fact should be known, in order that too late mowing of meadows, whether natural or artificial, may be avoided. The most favorable period for cutting grass is that of its flowering; if the operation be postponed till the seed is formed, two great disadvantages will arise; the first is, that fodder obtained will have parted with the greater portion of its nutritive qualities; and the second, that the plants having fulfilled all the laws of their nature, by providing for their reproduction, cannot flourish again with vigor during the same year.* In support of this doctrine, I will mention one well known fact, which is that meadows mown before fructification afford the most abundant harvests, and the gratest number of them, as they may be mown several times in a year. The perennial plants which serve as fodder, may by this means be preserved for several years in a state of reproduction; but if mown after the formation of seed, the plants are weakened and the production is lessened. All farmers know, that when they subject to tillage a piece of artificial grass land, which has for several years been constantly mown at the time of flowering, it will yield several harvests without any dressing; but if

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* This holds good only in part in regard to timothy (*Phleum pratense.*) According to Sinclair, this grass contains more than double the nutriment when in seed than when in bloom. At the same time the remark of Chaptal is correct, that the root is much more exhausted by maturing seed—the aftergrowth is comparatively trivial, and the subsequent crops are diminished. By cutting rye in flower, or before, which is either annual or biennial, it may be almost rendered perennial, as we have witnessed, in sowing it with lucern. We have observed the same fact in regard to many garden productions—whose existence and vigor are prolonged by preventing the formation of the seed.—*Cultivator.*

the grass has been left to go to seed, it will be necessary to supply the earth with manure before it will yield a good return. As those plants that are cut at the time of flowering do not exhaust the soil so much as those that remain for seed, the belief has arisen among farmers, that before the period of fructification, they are nourished by the constituent principles of the surrounding air and water; but that during the time of the formation of the seed, their support is almost wholly derived from the earth. But this opinion will not hold in regard to all plants; lettuce, turnips, tobacco, woad, endive, cabbages, and onions, exhaust the soil greatly, though they are gathered before producing seed. Potatoes, though they produce but few seeds, impoverish land more than almost any other vegetable. Plants raised in a nursery, and afterwards transplanted, exhaust the soil in which they spring more than the one in which they complete their growth.

Thus we see, that during the whole time of their vegetation, plants derive their nourishment from the air and from the substances contained in the earth; but if they are mown at the time of flowering, they leave in the soil their roots and portions of their stalks, which restore to the earth nearly as much as they received from it; while, if they remain uncut till they have completed their course, they return little or nothing to the soil to compensate it for the nourishment they have received from it.

It is well known to farmers, that ploughing in a green crop of any kind whatever, prepares the soil for producing well without any other manure; since, by this process, all that the soil has yielded is returned to it, with some additions resulting from the decomposed principles of air and water, which are contained in the plants.

In order fully to understand this doctrine, which appears to me of great importance to agriculture, it is necessary to consider the successive changes which take place in annual plants during their growth; first, they produce green leaves, which, by coming in contact with the air, receive from it the principles of which I have spoken; subsequenly the stalks increase in size and number, and are covered with numerous leaves, which absorb from the atmosphere a degree of nourishment suited to the increasing wants of the plants; the strength, fulness, and depth of hue of the leaves and the stalks, particularly of the latter, increase in proportion to the richness of the soil.

This state continues till after the period of flowering, when a change, worthy of note, takes place; the roots dry up, the stalks wither and change their color; and when fructification is at length completed, both roots and stalks have become mere skeletons, which answer but little purpose either for nourishing animals or manuring earth. During this period of vegetation, what becomes of the juices that were so abundant in the roots and stalks? They have been consumed by the formation of the seeds. It is undoubtedly the case that plants still continue, during fructification, to absorb some portion of their nourishment from the air and soil; and this assists in the formation of their seeds; but by far the greatest share of the formation of these is owing to the deposites contained in the organs of the plants.

The same holds true of perennial plants; and it may be observed, that when a tree produces fruit too abundantly it becomes exhausted and dried, and bears only that which is small and misshapen. The difference between annual and perennial plants is, that the former die as soon as the process of fructification is completed; while the latter preserve their leaves green and their roots fresh, for the purpose of absorbing new portions of nourishment, to be deposited in their vessels for food when the returning warmth of spring shall cause them to require it.

M. Matthieu de Dombalse, one of our most enlightened agriculturists, has confirmed by experiments, the doctrine I have here advanced. On the 26th of June, 1820, at the time of flowering, he selected, within a small space, forty wheat plants of equal size and strength, each having three stalks bearing heads; he pulled twenty of the plants with all their roots, and left the rest to complete their fructification. Having carefully freed from earth the roots of those he had taken up, he cut the stalks two inches above the base, and dried separately the roots, and the stalks surmounted by their heads.

The roots and the portion of the stalks remaining with them weighed, grains - -	647
The stalks, heads, and leaves, - - -	1946.5
Total, - - - - - - -	2603.5

On the 28th of August, the time of harvest, he plucked up the twenty plants which had been left for seed, separating the roots and cutting the stalks as of the first; of these the weight was as follows:

	Grains.
Roots, - - - - - - - - - - - - -	419.53
Straw, husks, and beards, - - - - -	1318.75
Grain, - - - - - - - - - - - -	1025.69
Total, - - - - - -	2763.97

During these two months, the roots and the portions of stalks adhering to them had lost, - - - - - - - - - - - -	237.52
The stalks, head, and leaves had lost -	624.67
Total loss, - - - - - -	862.19

But as the seed weighed 1025.69 grains, the whole had increased in weight 160.47 grains, Troy. From this experiment we may conclude, that the juices contained in the plants, at the time of flowering, contribute to the formation of the grain in the proportion of $\frac{86219}{102569}$, and that the excess of the weight of the grain which is $\frac{16947}{102569}$ arises from the nourishment which the plants absorb from the air or soil, during the two months of fructification.

If the wheat is mown when in blossom, it leaves in the earth, to be converted into manure, a quarter part of the weight of the plant; but when it is reaped after having come to maturity, there remains only one-seventh; and this last residue is worthless as manure in comparison with the first; this contains almost nothing but carbon, while that is rich in juices and in decomposable matter. Thus we see that those plants which form seeds exhaust the soil most, because for all they have received they return nothing but their dry roots and stalks; while those that are cut when green give back with their roots and stalks what they have drawn from the soil, and a part of that which they have drawn from the atmosphere.

The nutritive principles contained in the soil pass

into plants only in a state of solution, or of extreme division in water. Healthy plants absorb from preference those salts that are most congenial to them; but if waters be charged with salts unsuited to their natures, they absorb the fluid and reject the salts till the water becomes thickened by them. There are some salts which enter naturally into the composition of certain plants; the pellitory and nettle, for instance, which grow upon the borders of the sea, contain muriate or sulphate of soda; these vegetables, transported into other soils, afford no vestige of these salts, and their growth is vigorous. M. le Marquis de Bullion has proved that the turnsol, raised in earth containing no nitre, does not, upon analysis, afford a vestige of any; but that plants of the same kind, raised in the same soil, but watered with a solution of nitrate of potash, are charged with that salt.

Generally speaking, a superabundance of salts, especially if they be of kinds very soluble in water, injures vegetation; this is particularly the case when the salts are not such as enter naturally into the plants, among the number of their constituent principles. Salts of foreign natures cannot be useful, excepting as they may serve, in very small quantities, to excite and stimulate the organs of plants. The great value of sulphate of lime as a manure, is owing to its insolubility, which allows water to contain but a very small portion of it at once; so that it passes into plants very gradually, and thus its effects are prolonged for several years; till, as I have before observed, the soil is exhausted of it.

The quantity and quality of the salts contained in plants may be ascertained by an analysis of the ashes arising from burning them in a dry state. It may not be useless to mention here some facts which may throw light on this subject.

Kirwan and Ruckers have proved, that an equal weight of herbaceous plants furnishes more ashes than of ligneous plants. M. Pertuis has found, that the trunks of trees afford less ashes than the branches, and these last less than the leaves. Evergreens yield less ashes than trees and shrubs that shed their leaves in autumn. On the other hand, Hales and Bonnet have observed, that the perspiration of herbaceous is greater than that of ligneous plants, and that that of evergreens is less than that of plants which shed their foliage. These circumstances may explain why some plants afford more ashes than others. The water which is evaporated by transpiration deposites in the cells of the plant the salts which it had held in solution, and is replaced by a new quantity, which is in its turn thrown out, leaving behind it an additional portion of salts; so that those plants, and those portions of the same plant, which transpire most, must necessarily contain the greatest quantity of salts.

The salts and earths contained in plants are of the same nature as those existing in the soil in which they grow, but not, according to analysis, in the same proportions; because the plant absorbs more or less of them according to its own nature and their solubility. It cannot, however, be strictly said, that all the salts contained in plants existed previously in the soil, as some neutral salts are evidently formed within their organs; such are those of which the acid is known to us, and particularly those that contain in their composition a vegetable principle: of this sort are the acetates, the malates, and the citrates. The salts do not exist after the burning of the plant, because their acid is decomposed by the action of fire, and there remains only the base, which is usually potash or lime; but an analysis of the plant "by *the wet way*" gives proof of their existence.

It is even possible in some cases to follow the formation of the acid, by observing the progress of vegetation, and the changes produced in its products. Of this I will mention one example, Beets gathered late in autumn, in the north of France, do not yield the same principles as those gathered at the same period in the south of France; the first contain sugar, the second saltpetre. According to the experiments carefully made by M. Darracq in the department of Landes, the best roots of the south yield as much sugar in the month of August and the earlier part of September, as those of the north; this sugar then is replaced by saltpetre, of which the acid is formed during the progress of vegetation. It has been observed, that beets containing sugar frequently underwent a change during the winter by which the sugar entirely disappeared, and was replaced by saltpetre; in this case we can almost follow with the eye the process of decomposition. The juice of beets in which the change has commenced, when thrown into the boilers, becomes covered with a thick, white foam, which gives out a reddish vapor of nitrous gas; in this state the labor of extracting sugar becomes very difficult; the sugar crystalizes badly, and the proportion of molasses is very great. It may be seen clearly, that in this state oxygen is already united in the beets with azote, and that only an additional portion, which would be gained during the progress of change in the roots, is wanting for the formation of nitric acid; this combined with the potash, which is contained in these roots in the proportion of 1.100 of its weight, would produce saltpetre.

If we observe a plant during the various stages of its vegetation, we shall perceive at these different periods very remarkable difference in the odor, taste, consistency, &c.; from this circumstance we must suppose that it forms new products, new combinations, and consequently new salts.

The alkaline salts are the most abundant in green herbaceous plants. M. de Saussure has observed, that the ashes of young plants that grew upon a poor soil, contained at least $\frac{3}{4}$ of their weight of alkaline salts, and that those of leaves of trees which grew from their buds contained at least $\frac{1}{2}$.

The proportion of alkaline salts diminishes in proportion as the plants advance in age; this remark applies equally to annual plants and to the leaves of those trees that shed their foliage in autumn. The ashes of seeds contain a greater proportion of alkaline salts, than those of the plants that produced them.

These facts are very important to those who are engaged in the manufacture of salts furnished by the combustion of vegetable substances; since they show clearly that it cannot be equally advantageous to them to consume all sorts of plants, nor at all periods of their growth.

Next to the alkaline salts, the earthy phosphates of lime and magnesia are the most abundant in plants, and like the first, these diminish in quantity in proportion to the age of the plant. Plants also contain, but in very small proportions, silica, and some metalic oxides, especially those of iron.

From the Lynchburg Virginian.

AN ESSAY, READ BEFORE THE AGRICULTURAL SOCIETY OF ALBEMARLE.

In obedience to a resolution of the society requiring of me an essay upon some agricultural subject, I shall proceed, hastily to give, first, some general views on the subject of ploughing. Deep ploughing, is certainly the first great step towards improvement; it not only facilitates the improvement of the land, but it is a safeguard against the drought, and also the washing rains of summer, which we often suffer from—especially the corn crop. But the great advantages resulting from deep ploughing do not stop here—by it, you bury all seed injurious to the land and crop so deep, that they never vegetate, leaving a clean surface for the seed sown. Good ploughing, however, cannot be done, without good ploughs, of which we have very few. The M'Cormick plough, when well made, is a good plough for light foul land, but it has not sufficient strength for rough, or turfy land; and I have never seen one that would stand a draught of three strong horses, and that would not get out of order in one season, and often in one day.

The plough which I think best adapted to our soil, and would recommend to the society, is the bar-share. I have used this plough for more than thirty years, and I believe the improvement of my farm is more indebted to good ploughing than any thing else. I will endeavor to exhibit one for the inspection of the members of the society, and would urge them to adopt some mode by which they could be produced. The bar-share has many advantages over any other plough—one great advantage is the coulter, another is the peculiar shape of the mould board, which does not offer so great a resistance to the surface, and at the same time turns the soil more effectually. I have been ploughing from eight to twelve inches deep with this plough ever since I have been farming, without ever in one single instance injuring my land, but on the contrary, greatly to its improvement.

There is however, one great mystery with respect to deep ploughing, which I have not been able to solve to my satisfaction, and which I would like some of the members of the society, more conversant with the subject than myself, to explain: it is this—no matter how much clay you turn up in flushing your land, in one season it all disappears, and you see nothing but good soil again upon the surface. One more observation upon the subject of deep ploughing, and I shall then pass to another important subject connected with agriculture. It is certainly very desirable to have a deep soil for profitable cultivation, and if nature has not provided it, art must be resorted to. Long experience has convinced me of this fact, that just as deep as your plough goes, so deep will your soil be.*

I will now submit a few remarks on the second step towards improving—that is, the carefully making and taking care of manure. How few of us make one-half of what we might, and how very important an item it is, in the account of farming. There are many opinions as to the time, and mode of using it. Convenience has always dictated the time, the quantity being the greatest object with me. I have always thought it unimportant whether you make use of it on the surface, or plough it under. By using it on the surface, the first crop derives a greater benefit from it than by ploughing it under—but by ploughing it under, the second and succeeding crops derive a greater benefit, than by using it on their surface, and is to be preferred, except for the wheat crop, which I think best to harrow in with the wheat. One advantage, however, of the surface mode, is, that the clover is more apt to succeed well, on soils not particularly kind to the production of that invaluable crop. As there are other subjects to which I wish to call the attention of the society, I should be consuming more of its time than the present occasion would admit of, were I to dwell more lengthily upon this important branch of my essay.

I would now invite the attention of the society to the great advantage to be derived from having a farm entirely rid of all pests to which our soil is so liable. Long experience has proved to me, that a farm of this character, may be worked to a greater advantage with almost half the number of hands, than one infested with pests, such as thistle, mullein, St. Johns's wort, wild carrot, and many others, not less objectionable and equally injurious to the land. The remedy which I have adopted is to keep a large stock of cattle. I am very well aware that this is considered by many (and some judicious farmers too) as bad management; but I have found that my farm, if not improved as fast, is at least clean, and improvement is facilitated; and, it is in fact almost the only mode of getting rid of the *sassafras*.

Another very important subject to which your attention is invited, and one attended with economy to the farmer, (which is certainly an important consideration and recommendation to any plan connected with the operations of a farm) is that of stone fencing, which is indeed "killing two birds with one stone:" for while you are moving a great pest, you are securing to yourself a lasting fence, and one that is no inconsiderable ornament to your farm. My farm is nearly half enclosed with a fence of this kind, and I find it much cheaper than cutting and hauling rails every few years. There are a great variety of opinions as to the best mode of constructing a stone fence—but I have found the following to be the most durable, or, in other words, least liable to tumble. It is of course important to give the stone work depth of foundation sufficient to place it beyond the influence of the frost. The fence should be eight feet wide at the base, and three feet high, and from six to eight inches on the top; upon this place a lasting rail either of chestnut or heart pine. At intervals of eight feet, I let into the ground locust stakes, on both sides inclining to the wall and crossing on the rail; in the lock or cross of the stakes, another rail is placed, which keeps the entire fence perfectly secure; a fence on this plan, may be said, to be "as lasting as the hills."

Observing some time since a piece from the Gen-

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* These remarks are doubtless correct as to the red lands of Albemarle, which possess such rare and valuable qualities. But they would not apply to shallow soils incumbent on a steril subsoil, whether of sand or clay.—Ed. Farm. Reg.

esee Farmer, on fattening hogs with apples, I was induced this year to make a trial of it, and I now take pleasure in communicating the result to the society. In June last my hogs were poor and diseased. I put them into my orchard to let them get the benefit of the apples, and to my agreeable surprise, in a few weeks, my hogs in the orchard were much fatter than those which had been fed on corn, and continued to thrive until they were entirely fat, not having had one grain of corn—and I would venture at this time, to challenge a comparison with any lot of hogs that can be produced.

I sincerely hope that others may be induced, from this experiment, to turn their apples into pork, instead of permitting them to fall and rot upon the ground.

I conclude my humble contributions to the society, by offering to you, gentlemen members, my unfeigned thanks for the honor you have conferred upon me.

JOHN H. CRAVEN.

From the Silk Culturist.

PROFIT OF A HEMP CROP COMPARED WITH SILK CULTURE.

We are indebted to the politeness of Samuel Chew, Esq., of Lexington, Kentucky, for an estimate of the cost and profit of a crop of hemp, coupled with a request that we will compare it with a silk crop in New England. We cheerfully comply with the request, prefacing, however, the remark that from the rich bottoms of Kentucky, a much larger crop of silk may be expected than from the ordinary land of New England. With respect to the labor necessary for a hemp crop, Mr. Chew says: "I wish very much for a fair comparison between the silk and our staple, which is hemp. I will give you the cost of an acre of hemp. As it takes the best land, the rent is worth, - - - - - $4 00

The land must be ploughed at least twice; the best farmers plough three times and harrow twice, which will take a team two days, at $1 a day, is	2 00
It takes one and a half bushels of seed, at $1 a bushel, - - -	1 50
Cutting the hemp will take two days, at $1 per day, - - - -	2 00
Tying it in bundles and stacking, one and a half days, - - -	1 50
Spreading it down to rot, one day,	1 00
Breaking is always done by the short hundred, as we call it, of 100 lbs,	5 60
	$17 60
Five hundred pounds, of 112 lbs. to the hundred, which we sell by, is a good average crop to the acre, and $5 a hundred, may be called the average price for the last ten years, with the exception of the last, will give $25 as the product of an acre well cultivated,	$25 00
Nett profit,	$7 40

☞ Seventy-five pounds being a man's task to break in a day, will leave us the above sum of $25 for fourteen days work; or $7 40, if we could hire the work done, which is nearly impossible, as it is very dirty, and so laborious that scarcely any white man will work at it; of course it is entirely done by slave labor. A stout man will make nine or ten acres, when well managed; and as it does not interfere with a corn, or scarcely any other crop, may make something besides. Thus you see, a stout man will make from two hundred and fifty to three hundred dollars. Negro women cannot labor at hemp at all, and are scarcely worth any thing. Although our crop does not appear so visionary as your silk crop does per acre, from your least calculations of from one hundred and forty, to five hundred dollars; yet as a whole, will it be as good as hemp to slave holders? If near it, I assure you, I for one, will quit hemp. I wish a fair comparison, and if it cannot be obtained through the medium of your paper, how am I to obtain it?

We have long been of the opinion that the culture of silk is peculiarly adapted to slave labor, especially females, infirm male adults, and children of both sexes. Little muscular strength is required, and no more judgement and skill than ordinary negroes may exercise under the care and direction of a judicious and attentive overseer. With respect to the comparative profit, we would refer Mr. Chew to the communication of Messrs. Cheney in the last No. of the Culturist. According to their estimate, 14,000 Chinese plants of two years growth to the acre, would furnish 35,000 lbs. of foliage, which would be sufficient to make at least 350 lbs. of silk, worth, after deducting the expense of reeling $1050. The labor necessary to attend a family of worms sufficient to make that quantity of silk could not exceed 230 days, which being estimated at a dollar a day, and deducted from the gross amount would leave a nett profit of $820. The experiment of those gentlemen has not been completely tried, yet we have little doubt of the capacity of the lands and climate, of Kentucky, to produce it.

We see no difficulty in the way of a successful prosecution of the culture of silk in connexion with the culture of hemp, on the Kentucky plantations. The silk crop is not commenced until some time after the time of sowing hemp is passed, and it is finished before the hemp crop is ready for harvest. Help also which would be worthless on the hemp crop may be profitably employed on the silk crop, and the nett income of the plantation is thereby astonishingly increased.

From the Silk Culturist.

LABOR REQUIRED FOR SILK CULTURE.

It is difficult to make accurate estimates of the labor required in feeding and attending a family of silk worms of a given number; as there are several circumstances which tend to increase or diminish it materially—such as the distance the foliage is from the cocoonery—the size of the trees and the quantity of their leaves—the variety of the tree, whether Chinese or Italian, &c. &c.

The following estimate, however, has been made, by a correspondent of the New York Farmer, which may be regarded by the culturist as accurate as any thing he can find on the subject, short of actual experiment. "The labor required to attend 1,000,000 worms would be, the first week,

two persons; for the second, four; for the third, eight; for the remaining two, fifteen or twenty." This will make an aggregate amount of 324 days necessary for a family of this number. The same writer estimates the product of this number at 500 pounds, which, at present prices, cannot be estimated at less than $3 a pound, after deducting the expense of reeling.

If these statements are to be relied on, it will be easy to calculate the nett profit which may be expected from 1,000,000 worms. The gross profit being $1500, the expense of the labor is to be deducted. Calling this a dollar a day, which is the highest it can be called, it will amount to $324, which being deducted as aforesaid, would leave a nett profit of $1,176. But when the fact is taken into consideration, that most of the labor can be performed by boys and girls, and aged women, its expense will be materially diminished, and the profit proportionably increased.

From the Silk Culturist.

PRICE OF MAKING COCOONS.

In most of our estimates of the profits of a mulberry plantation, we have put down the labor of making silk at three-fourths of its value, and in no instance less than one-half. A few days since a silk grower from Mansfield informed us that he was ready to contract for making cocoons at $1 a bushel, which is one third of the price they are now selling at the silk factory in this city. He remarked that he could furnish the help and make a fair profit at that price. From this statement it will be seen that foliage sufficient to make a bushel of cocoons is worth, on the tree, $2.00, and according to to the quantity ordinarily consumed in making a bushel, one and a half cents a pound. Taking this as the basis of a calculation, a farmer may readily ascertain the income he may derive from this source, without interfering with his other agricultural operations. The sale of mulberry foliage is a very important article of traffic in Europe and Asia, and we have no doubt, will soon be, in America. Every farmer who sets out mulberry trees will very soon derive a fair profit from them, though he may not be disposed to engage in the culture of silk. We hope no farmer will neglect to provide in this manner, a fund from which, both himself and his posterity may draw at pleasure.

TRANSACTIONS OF THE GEOLOGICAL SOCIETY OF PENSYLVANIA.

The second half volume of this work has recently been published, and is a splendid monument of the public spirit and liberality of the Society, and of the individual members of whose labors it records. We have learned, with more regret than surprise, that this very expensive publication has exhausted the funds of the Society. Compensation for even the pecuniary expense of the publication was probably not counted on, and will certainly not be found. But it well becomes every wealthy friend to science, and to the best interests of our country, to bear a small portion of this expense, and at the same time serve himself, by adding this valuable work to his library. We profess not to be able fully to appreciate the value of this and similar works, and unfortunately but few persons in Virginia, as yet, are much better informed on this very important branch of science. But all those who are as little instructed as we are, may profit well by an examination of this volume, even though the benefit be limited to their learning what vast and rich resources such investigations may present, and how greatly they are needed to bring to light the natural resources, and the (as yet) *dead capital* of every country, and none more than of Virginia. If more is wanting to induce Virginians to lend such slight aid to these noble efforts of the Geological Society, they may be presented in the fact that a large proportion of the papers are devoted particularly to the geology of portions of this state, and must serve greatly to develope our mineral resources and wealth. Especially, all individuals concerned in coal lands, and in mining of every kind, will find much interesting matter, and in many cases, in reference to their own individual labors, or possessions. It will be a laudable, though very small return for important value conferred by this Society, if the legislature of Virginia would purchase as many copies at least as to furnish one to every College and public library in the state. However small the means, this and similar measures would aid the most important public work now in successful progress, of a general geological survey of Virginia, by fostering the growth of a taste for such investigations, gaining favor for them from intelligent inquirers in all parts of the state, and by aiding and directing their examinations, might put to work hundreds of private individuals, who would gather and treasure up numerous facts, by observations made in advance, and yet essentially in aid, of the future examinations of the geological surveyor.

Besides other papers of general application and interest, the following are reports on subjects belonging to Virginia, and several of which required much time, labor, and science to investigate, and the results of which are here presented to the many who may profit by these gratuitous labors.

Memoir of a section passing through the Bituminous Coal Field, near Richmond.

Analysis of some of the coal of the Richmond mines.

Notice of a geological examination of the country between Fredericksburg and Winchester, including the gold region

Review of geological phenomena, &c. in two hundred and fifty miles of sections in parts of Virginia and Maryland.

Account of travertin deposited by the Sweet Spring waters (already re-published in the Farmers' Register.)

Observations on a portion of the Atlantic Tertiary region.

We shall hereafter extract some of the portions that may be found suitable to our work—though the choice will be very limited, owing to the necessity of our omitting the plates which are so often required for illustration, and with which the volume of Transactions is profusely and beautifully embellished. Some of the most expensive plates are representations of fossil bones, such as are often found by our marl digging farmers, but which are rarely preserved to aid scientific investigations. In this manner, many persons might easily aid the labors of the Society: and for this pur-

pose we invite our friends, and especially our former neighbors, to take care of such fossil bones as may be found, of large size, or in an unusually perfect state of preservation, and to place them in our hands, to be sent to the Geological Society of Pennsylvania.

From the Magazine of Natural History.

EGGS PRESERVED FRESH BY LIME-WATER.

The method of preserving fowls' eggs in lime-water for eating is well known, but does not seem to be practised as it deserves to be. We are still using eggs at breakfast which were preserved in April last year; and they are as good as the day they were laid, retaining the milkiness and delicate taste peculiar to a new-laid egg. I had one, two days ago, marked "1st April" (then, of course, ten months and nineteen days old,) with all the characteristics of a newly laid one. It is lime-water, in fact, that we use, and the eggs are mostly warm when put into it. None of them are allowed to be twenty-four hours old: this is essential, I believe. The shells are liable to crack in the boiling; but the eggs do not burst; and [only] a very few of them have a slight curdy flavor, not unpleasant, however, to those who like new eggs.

A SUBSCRIBER.

Vale of Alford, Aberdeenshire, Feb. 22, 1833.

ON THE TILLAGE OF INDIAN CORN.

To the Editor of the Farmers' Register.

Montgomery Co. Md. Jan. 15, 1836.

I have observed several pieces lately in your valuable Register, on the cultivation of corn, and as they all differ from the system that I have been pursuing for several years with great success, I am induced to present it for the experiment of those who may not be so fortunate in their present practice. My farm of 520 acres is divided into seven fields, of about sixty acres each—one of which is put in corn—two are in wheat—one in rye—and three in clover—so that it will be perceived, that a field goes in corn but once in seven years—and my rotation of crops is such that it remains in clover and blue grass, with which, by this time, it becomes too thickly set for any other crop, two years, or eighteen months previous to its going in corn. I greatly prefer for corn, a field that has yielded no crop the year previous: it is more capable of sustaining the heavy demand that is required of it—and the sod, which if turned well under, will be decomposing throughout the summer, will tend to ameliorate the land, and contribute materially to the support of the growing crop. I prefer breaking such a field in the spring. If broken in the fall, it becomes too compact during the winter, and you must either cross-plough, or list in the spring, which brings the sod upon the surface unrotted—adds materially to the labor of keeping the corn clean when young, and defeats the other goods effects that I have stated would result from having it well covered. As early in the spring as the ground will admit, and I never plough when the ground is wet or heavy, I start two large three-horse ploughs, drawn by three strong horses—with directions, which I see executed, to my ploughmen, to plough as deep as the horses can draw the plough, and in every instance in which they skip a place, from the plough being thrown out by a stone, or other cause, to cut it on their return—being fully satisfied that the success of every crop mainly depends upon the preparation of the land previous to planting. After the field is broken, which takes from fifteen to twenty days, I start two large three-horse harrows, and harrow first the way it was ploughed, and then cross-harrow, which if the spring is favorable, prepares it as nicely as if intended to be sown in wheat. It is then laid off in rows four feet apart, which finishes the preparation for planting. I prefer *checked*, to either *step* or *drilled* corn, where the land is not too steep, because it enables you to substitute the plough for the hoe—a much more expeditious, and I think, effectual mode of cultivation. But even in checked corn, I would not entirely dispense with the hoe. There is no implement so effectual in cleansing and cultivating corn when so small that the plough cannot approach sufficiently near without danger of covering or loosening the plant—but one hand-working I deem all sufficient, and that, merely to remove any little grass which may have sprung up near the corn, or to loosen the ground in case it should have become encrusted when the corn is young. But in step,or drilled corn, it must be used at least twice, or oftener, to cleanse or loosen the step or space between the hills; for although many adopt the smothering system, by throwing the earth with the plough in upon the step, and thus covering the grass, I am decidedly of opinion, it is best to remove it. Having every thing in readiness, my plaster and unleached ashes mixed, (which I do on my barn floor, by first sifting the ashes to remove all fire-coals, and lumps of other matter,) I take equal proportions of each, and have it well mixed, and put in barrels which I take to the field, and have placed in a row directly through the centre of the cut intended to be planted, so that the two who drop the mixture, drop from the centre to one extremity of the row and return, which gives them time to replenish their bag or apron, and be in readiness for the plough and corn dropper on their return. My force in planting consists of a ploughman, one who drops the corn, two the mixture, and four who cover. The number of hills that will be in each row is ascertained and divided between the four coverers in proportion to their strength. The plough then starts crossing the rows that have been laid off four feet apart. At their intersection the corn dropper drops from four to six grains, and is followed immediately by the dropper of the mixture, who drops about a large table spoon full directly upon the corn, which is instantly covered. So that the whole operation is carried on in the same row. This keeps those who cover separate, and prevents conversation, which invariably leads to neglect of their work—enables you to apportion the labor where your hands are of unequal strength, and at dinner, at night, or in case of a rain coming up hastily, to leave no row unfinished. Having completed the planting, the field remains until it requires replanting. As soon as the corn grows to be three or four inches high, if there has been no heavy rain to bake the land (in which event I first run the double-shovel plough,) I start a two-horse harrow with such of the teeth as would follow immediately in the row being first removed, and a little boy who follows after with a light rake to re-

move any stones or clods that may be drawn on the corn. The hoes then follow, remove any grass that may be near the corn, loosen such hills as the harrow may have missed, and set up, and draw a little earth around such plants as the harrow may have prostrated or exposed. The corn is then thinned, leaving two stalks in a hill, and receives two shallow ploughings with the double-shovel plough, which brings it to about the 15th or 20th of June. I then give it a deep ploughing, with a single shovel plough, which brings up the sod that had been turned under in the spring thoroughly rotted, which affords sustenance to the corn at the period when it most requires it—and after it has acquired sufficient rise to shade and cover the ground from the exhausting influence of the sun. It then remains until I finish my harvest, which is generally between the 5th and 10th of July, when I again run the double-shovel plough with a view to level and cleanse the land preparatory to seeding rye, which generally takes place about the 10th of September. The following spring the field is sowed in clover and plastered.

I have thus, Mr. Editor, submitted to your disposal, a detailed statement of my system in the cultivation of corn. The farming interest, and not my supposed mortification at not seeing it appear in your valuable work, will, I hope, be your only consideration as to its publication.

J—— P——.

ADDRESS DELIVERED BY JAMES M. GARNETT, ESQ., PRESIDENT, BEFORE THE FREDERICKSBURG AGRICULTURAL SOCIETY, AT ITS ANNUAL MEETING, ON FRIDAY, THE 13th NOVEMBER, 1835.

Gentlemen—Members of the Agricultural Society of Fredericksburg—

As I have never been a systematic man in any thing, and have had 16 or 17 years experience of your kind indulgence for this failing of mine, I will once more presume that you are still willing to take me—as every man takes his wife—"for better, for worse," and shall therefore proceed to address you in my usual desultory way.

First, I will venture to present you with a little of that gratuitous donation which every man is so fond of bestowing; but very few of taking and applying to any useful purpose. I mean—*advice*. I ought perhaps to abstain, since so many millions before me have failed to accomplish any good by it; but the signs of the times, I think, afford the most cheering hopes, that on the present occasion it will not be altogether thrown away. This advice is—to cultivate and encourage, by all the efforts in your power, that appetite for scientific agriculture, which is now so prevalent, as the only sure basis of all good practice, of all real improvement. That both these are "looking up" (as the mercantile men say,) I infer from the increased circulation of agricultural Journals, such, for example, as those two excellent works "The Farmers' Register" and "The Cultivator"—both of which contain much valuable information in regard to all the branches of husbandry. These, by the way, cannot be too strongly recommended; for both are edited by men of unquestionable talent, knowledge, and agricultural skill, whose experience and high standing in their respective States form a sufficient guarantee for the utility of any thing they will sanction with their names. Both these Journals and all their ablest correspondents concur with me in most earnestly recommending to all agriculturists, that they should base agricultural *practice* upon agricultural *science*. Indeed, the recommendation to combine sound science with practice—as the best means of perfecting the latter—may be safely adopted as a universal rule, applicable, not only to husbandry, but to all trades, professions, and callings—nay to all the legitimate pursuits of life with which, what we understand by the term, *practice* has any thing to do. For example, if you wish for power, the certain course is, *to gain knowledge;* do you desire fame, you *must obtain knowledge first;* would you accumulate great riches, *much knowledge is requisite for the task;* above all, should you seek the greatest comforts, conveniences, and highest enjoyments of life, it is indispensable to acquire *knowledge, sound, useful, scientific knowledge.* In short to gain this inestimable treasure is our great duty in our present state of existence, and according as it is fulfilled or violated will assuredly be our condition both here and hereafter.

This, perhaps, may be "travelling" a little "out of the record," as our brethren of the bar would say; but in extenuation I will urge, that such excursions have often the good effect of attracting attention to useful remarks which, otherwise, would pass unheeded, if anticipated as matters of course. With this excuse for my deviation from the beaten tract, I shall proceed to another subject of quite a different character. This will be to give you the results of various experiments, made by myself, and of some made by others, since our last meeting. I shall state them, rather in the proof of my determination to follow the course which I have so often recommended to all my brother members, of reporting annually their experience, than for any peculiar value which I attach to them. But the whole body of husbandry being made up of a great number of minute facts and particulars, they must be given in detail by a considerable number of individuals, or it would hardly be practicable to collect them at all.

The first two experiments which I will mention have already been stated in the Farmers' Register, but, as all our members do not take that very useful paper, I will state them again.

From one pint of skinless oats, drilled in a square of my garden, nine inches apart one way and two inches the other, as near as I could have it done, I obtained one hundred and sixteen pints; one of my brothers made five pints from fifty-seven grains. The oats in my garden covered a space of 247 square yards, and would have yielded somewhat more, I think, but 3 spots—each 6 or 7 feet square—were lodged and consequently injured. The oats, when ripe, stood at the average height of about 4 feet, and the grain weighed 47 pounds per bushel. The ground between the drills was hand-hoed twice, and the drills hand-wed twice.

From half a gallon of blue-stem wheat—also drilled—I obtained forty-two half gallons, weighing sixty-one pounds per bushel. The half gallon was drilled, late in October 1834, in some land, from which I had taken a crop of Irish potatoes, manured with stable manure in the trenches. These were reversed in digging, so as to bury the

vines between. The top of these new ridges, in which the vines were partially decayed, were chopped down, and trenches opened on them about 2 or 3 inches deep. In these, the wheat was thinly drilled, and lightly covered with an iron-tooth garden rake. It was hand-hoed 3 times and hand-wed twice, but was considerably injured both by the frost and the fly. Another injury was done by 5 fruit trees of a medium size which grew among the wheat. The drills were unnecessarily far apart, being 2½ feet, but I gave them this distance, that the wheat might grow exactly over the buried potato vines. Next year, however, if we live, I shall have it in my power to report to you the result of a much fairer experiment, made with this same variety: for I have drilled ⅝ths of an acre, with a hand-drill, made for the purpose, in some well marled land, previously capable of producing fifty or sixty bushels of corn to the acre. The remainder of this wheat I have sown over a fraction less than three acres of land of medium quality, cultivated this year in corn. The process was to cut off and remove the corn, then to plough up the land, and next to sow the wheat, which was put in by cross-harrowing with an iron-tooth harrow. One acre of this piece had the drag-log first passed over it, the same way with the ploughing, previous to the sowing of the grain and harrowing it in. Of this simple contrivance for crushing the clods, which will always be left after the best ploughing, I will take this occasion to say, that it promises to answer the purpose, far better than any roller or heavy harrow that I have ever seen or heard of. I was induced to try it by two very strong recommendations in the Farmers' Register; in the first of which it is said to be the invention of Mr. Thomas B. Gay, of Goochland, in this state. Like all first trials of a new thing, made with too little care, mine proved somewhat troublesome; for, after fixing my drag-log for two horses, I had to make it lighter twice, and even then, as the log was green, it was a heavy draught. The direction is, to take a straight log, of any kind of wood most convenient, 6 or 7 feet long and about 18 or 20 inches in diameter, (22 or 24 would probably be still better,) at both ends, then to split it and hollow out one of the halves, until you get it sufficiently light. After this, fix two strong bars across the log, and mortice them into another piece of the same size, parallel to the log, and nearly of the same length, to which the horses, mules or oxen are attached, as to the cross bar of a roller. The superiority of this very simple and cheap contrivance, (for the merest cobler can make it,) over any implement yet used for pulverising ploughed land, none can easily conceive who have not seen it tried. It is certainly true that the same team will draw a roller of the same weight with more ease; but even, supposing that the drag-log required an additional horse—say 3 instead of 2—the latter would do the work so much more effectually, as greatly to overbalance the difference. But let any member try it before we meet again, (it may easily be done,) and most confident I am that his report will furnish additional testimony in favor of the drag-log. As a smoother, and preparer of the surface for grass seed, afterwards to be put in by a fine, light harrow, it is incomparably superior to the roller, unless the land be entirely too stiff and hard to admit of being minutely pulverised by any thing.

My experiment with the Guinea grass is still continued. I have now more than an acre of it, all of which we have cut four, and some of it six times, at an average height, I will venture to say, of more than two feet, although I have not measured it this season, each time, as I did last. I ought to add that we have again suffered severely from drought. The only possible objection that I can yet see to this valuable exotic is, the supposed necessity for cultivating it. I say *supposed*, because I am inclined to believe, from my short experience, that if you plant the roots close enough, in the first instance, and work them once or twice, you may well trust it to produce broad-cast afterwards; for it will certainly spread so as entirely to fill up the intervals between the rows, if they be not more than 18 or 20 inches apart. This, I understand, is the practice in the West Indies, where, after the first planting and a slight culture, the plants are safely trusted to their own natural powers of increase. I have been the more minute on this subject, because the whole of our tide water country is deeply interested in the subject of what are called—"the artificial grasses." No man who lives in it, but must often have had his "bowels of compassion" strongly moved in behalf of such of our skeleton cattle as survive the continued starvation of a winter and spring, spent in masticating with worn out grinders, corn-stalks, containing perhaps, an ounce of nutriment to the long hundred weight—or else in chewing upon, nothing! the cud of hopeless despondency, and all this too, in most cases, after a summer and fall most industriously occupied in foraging, at the rate of twenty miles a day, for the wherewithal, not of that little known article—*grass*, but of *weeds*, to stay the almost ceaseless corrodings of hunger, until the following day of renewed, but illy compensated, toil and suffering again makes a demand upon their muscular strength, as well as their catering talents, fully equal to all they can command. My good friends—one and all—these things ought no longer to exist to our shame; let all of *us* therefore, to whom the facts apply, hasten to wipe off the disgrace *for such it certainly is*, since nothing is wanting to remove it, but *that* which all can command. Shall I be asked what *that is?* The answer is under every man's nose,—within reach of every man's eyes who can see. *Keep no more stock of any kind than you can profitably feed, and always take care to provide the necessary food for them.* In this simple precept consists the whole secret, (if there be any,) in regard to the propriety of keeping any stock whatever, since the sole object being *profit*, 'tis manifest that none ought to be kept that will not conduce to its attainment! 'Tis also palpably clear that all which are kept in the condition of "praise God bare bones" must inevitably conduce to its failure. How many of us may have been, or may now be, guilty of this violation of good husbandry, it is not for me to say; but acknowledging myself to have been one of the offenders, I may perhaps be excused for the attempt to draw others in with me, by way of securing company in my misdemeanors. We are all gregarious animals, and this strong propensity to involve others as participators of our own guilt in *every* thing wherein numbers are concerned, is an irrefutable proof of it. This must be my excuse in the present case, should any of my hearers believe,

that the neglect of farming stock is a very rare fault.

Another experiment which I have made during this summer and fall,—although on a small scale—is with six varieties of turnips obtained from one of Mr. Prince's Agents: viz. *Dales'* new variety, which the seed venders call *Hybrid*, the Scotch yellow stone turnip, the Norfolk white, the Tankard, the Purple top, and Swan's egg turnip, drilled on the 14th of August in the ground on which the blue-stem wheat had grown. This was the cause of my late sowing, as I waited after the stubble was spaded in, until I thought the process of its decay had somewhat advanced. The ground was marled, at the rate of nearly 300 bushels to the acre; this was pulverised as well as the hand-hoe could do it; then spread and lightly chopped in, so as to remain near the surface. The seeds were sown in shallow trenches, (say an inch and a half deep, and 12 inches apart,) by a hand drill, and the plants thinned out, at the usual height, to stand about 5 inches apart. The tops of the plants are now very flourishing notwithstanding the severe drought which we have suffered for some time; but the roots do not appear like attaining any great size, which is probably owing as much to the late sowing of the seed, as to the drought itself. Although each variety is distinctly marked, I cannot judge from this single trial which should be preferred for the table and which for stock, nor should I perhaps have mentioned the experiment at all, but from its connexion with a fact in favor of marl, that I deem worthy of your attention. But here, I beg leave to digress for a moment, to suggest a caution in regard to *all experiments*. This is—to keep a strict watch over ourselves during the whole process; for we are all too apt to form opinions in the outset for or against the result; and so to contrive matters *unconsciously*, as to make that result confirm our preconceived notions. This fact every man must have noticed in himself who ever undertook the unpleasant task of strict self-examination on any subject whatever; and I advert to it on the present occasion, for the purpose of producing the most rigid scrutiny of my own statement of the facts which I shall now submit.

In preparing the ground for the turnips, a few rows were left without either marl or manure of any kind. A few others were sown on the top of covered trenches which had been three or four inches deep, and filled with a mixture of drawn ashes, well rotted weeds and grass, and a portion of fresh cow dung scraped from the cow-pens. This being covered, was lightly chopped, and the seed drilled immediately over the deposite. In the quality of the spot on which these turnips are growing, there is no difference; but much in their present appearance. Around the trees they have been more *injured*, in proportion, than the wheat, and will make very little. The unmanured are considerably better than these—but much inferior to the rest; while the marled turnips, unaffected by the trees, are decidedly better in height, color, and general appearance than those immediately contiguous, which were manured as I have just described. As I am a new experimenter with marl, and have been in the habit of deducting a large per centage from all the accounts I have seen in its favor, on the score of *hobby-horseism*, (if I may be pardoned for coining such a term,) this testimony of mine in support of its claim to be used liberally, will be duly appreciated. I have always had a mortal dread, since I arrived at the age of manhood, of being either accused or suspected of *riding hobbies*, to which I remember being hugely addicted in my childish days; but this dread may not altogether have saved me; and therefore I deem it prudent on all such occasions, to warn my brother members not to suffer their confidence in my veracity—in which it is no vanity to say, they may entirely confide—to prevent their viewing and considering all my statements with that degree of rigid scrutiny which is absolutely necessary to enable them certainly to determine how far these statements contribute to confirm or disprove the principles or opinions designed to be established or refuted by them. The cardinal virtue of *impartiality* is indispensable, both in experimenters and their judges—for without it, no good whatever can be done to any cause whatever—but particularly to that of agriculture, whose improvement entirely depends upon fairly tried, fairly tested, and fairly judged experiments, frequently made, to determine every doubtful point of any importance.

Among my own experiments, since we last met, that, which seems to me at least, of most value, is one to ascertain the comparative productiveness of several varieties of Indian corn. This grain is certainly our chief crop in all the tide water portion of Virginia; and it is likely to become more and more so, unless some means can be discovered of preventing the constant ravages of the Hessian fly, and other enemies to the wheat crop. The importance therefore of ascertaining which of all the great variety of corn cultivated among us, will produce the most to the acre, is much enhanced by the present and long continued uncertainty of making wheat. The best modes of culture too, are consequently becoming objects of daily increasing interest—at least to those who have made up their minds, in the midst of the prevailing mania for abandoning the graves of our parents, wives, children, brothers, sisters, and friends, to live and die by good old Virginia. In these modes we have certainly made such great improvements, since I could recollect, as to encourage the hope, that we may make still greater—simply by taking care not to suspend or discontinue our efforts to improve, from vainly imagining, (as many do,) that we have already reached the "*ne plus ultra*" of advancement as corn-planters and makers.

I perfectly remember, that some forty or fifty years ago, scarcely any other implements, but the illy constructed plough of that day and the hand hoe were ever used in the culture of corn—that the distances at which it was planted were scarcely ever varied—that cross-ploughing was universal on high land—that the stalks were hilled up like tobacco plants—that unless from twenty-four to thirty-six furrows were run by the plough, between every two rows of corn, the proprietor, or his overseer, or both, were stigmatized as very lazy fellows. By the way, let *us* endeavor so to act, as not to furnish our successors with good cause to apply the epithet to us, who are now endeavoring to instruct them.

If any man in the by-gone days to which I have referred, had ventured to assert, before Col. John Taylor proved the fact, (Col. John Taylor, who has done more for Virginia agriculture than any man who ever lived in it,) that corn could be made

equally well, or better by running only eight or ten furrows between every two rows, provided the double, instead of the single plough was used; such asserter would assuredly have been treated with unbounded ridicule. Yet the practice, I believe, is now common; although I am satisfied that a still better may be, if it has not already been adopted by some farmers. I myself had hoped to exhibit to you, on this occasion, some implements for the culture—not only of corn—but of all crops planted in rows, which, unless I am deceived by that partiality for our own contrivances—so common to us all, will prove superior, especially in saving labor, to any I have yet seen. But I have been disappointed in procuring all the necessary castings, and therefore can only show two of them at present, with a drawing of the third.

The first is a jointed, expanding harrow, so contrived as to cut any distance from three to five feet, and designed in the first place to open the lists for planting corn, at the same time that it harrows each side of the bed on which the lists are formed; secondly, to work the beds between the rows, which it does by once passing from end to end—the coupling bolts enabling the ploughman to raise or depress the sides so as to work either a convex or concave surface equally well. It is intended for two horses.

The second is a single horse cultivator, with cast iron hoes of a new construction, which, unless I am much deceived, will be found superior to any now in use. Of these small hoes there are four, so fixed in a diagonal bar as to cut about twenty-one inches, and each to throw the earth moved by itself into the furrow opened by the one before it. Another advantage in it is, that it will throw the earth either to or from the corn, cotton, or tobacco, &c. which it may be used to cultivate.

The drawing represents a jointed cultivator for two horses, with seven such irons as those above described, with six harrow-teeth so fixed as to run in the intervals between the cultivator irons. The whole will cut four feet, some few inches. For these irons and the expanding harrow, I shall probably apply for a patent—not, I assure you, to enable me to sell them at an extravagant price, but merely to secure to myself the making of them at the usual fair profits made on agricultural implements, by fair dealers in such articles.

But let me not omit to give you the result of my corn experiment, to ascertain the most productive variety.

Having planted nearly my whole crop with selected seed from the Maryland twin-corn, and so arranged it as to guard it in the best practicable manner, against mixture, I resorted to the following method of comparing it, as to productiveness, with two other kinds, each of which has a high character. The produce in the number of ears and quantity, from thirty stalks of each kind, as they stood in a row, on land judged to be equal in every respect, was as follows:

Maryland twin-corn, 59 perfect years and 19 do. of short corn, - - 4½ gallons.
Richardson's, or Spottsylvania corn,
27 do. do. and 10 do. do., 3½ do.
Peg-corn, 33 do. do. and 4 do. do. 3½ do.

The weight of each kind, after drying for some time, in our common sitting-room, as ascertained by the pocket chondrometer, the little brass cup, of which was well and equally shaken in each case, turned out to be—

Twin-corn,	60 lbs. per	bushel.
Richardson, do.	61 do.	do.
Peg-corn,	58 do.	do.

Now although some, perhaps, may question the accuracy of this little implement, for determining the *actual weight*, per bushel, of any thing; yet, none who know what it is, can possibly doubt its being a perfect standard for testing *relative weight*—which is all that I mean to vouch for, in the above statement.

Another test to which I have subjected two of the above mentioned varieties of corn, has been to ascertain how much grain the same measure of each in the ears, equally heaped and shaken would produce. The result was, that two flour barrels full of years of the twin-corn yielded of shelled grain, four bushels, which was five gallons more than the barrel held; and of course, more than one measure of shelled grain for two in the ears. The other variety, (Richardson's corn,) overrun only two gallons. It is proper here to remark, that I made a second trial between the twin, and the Spottsylvania, or Richardson's, and the peg corn, by gathering and measuring the produce of thirty stalks of each kind, where the distances were alike in all—that is, five and five and a half each way—two stalks in a hill. The result was—

From 30 stalks of the twin-corn, 57 perfect ears, and 10, short corn; produce, 4 gallons 3 quarts.
Richardson's, 35 perfect ears, 12 short do., 4 gallons.
Peg corn, 33 long ears, 5 short do., 3 gallons, 2 quarts and 1 pint.

The peg corn was gathered and measured, in both instances, on a neighboring farm, by a disinterested person, who selected a spot of ground of the same quality with mine, which he knew perfectly well—and the corn on which he had very frequently seen during the summer and fall. He was apprised, too, of my wish to make the trial as fair as possible; my only desire being to ascertain the productiveness of the two kinds, that I might hereafter cultivate the best, and recommend it to others.

My conclusion from the whole experiment is, that the twin-corn is decidedly superior to the popular varieties with which I have tried it, in every respect before stated, and in two others not yet mentioned, in ripening earlier—for it is the dryest I have seen this season; and in producing much smaller stalks, and, of course, drawing less from the land.

In regard to experiments made by others—of which I promised to say something—I have heard of two which I deem worth presenting to your notice. Two gentlemen have informed me that the best corn they made this year, was cultivated, after it came up, entirely with harrows, skimmers and cultivators, with the usual hand hoeings. The other experiment, said to be successful, was, to destroy sassafras bushes, by sprinkling the leaves with brine, so as to make cattle brouse on them.

Before closing my remarks on the present occasion, let me entreat you my agricultural brethren, to encourage, more than you heretofore have done, the practice of reporting your annual experience. Be not deterred from this by any fear of ridicule; for you may rest perfectly assured, that those who indulge the disposition to laugh at your labors, will never of themselves be the discoverers of any

thing useful, nor reach any higher agricultural honor than that of being dead weights upon the society, which is so unfortunate as to have them for members.

The most important of all feelings, or desires is, to gain *useful knowledge;* the next in utility, and therefore in dignity, is, *the wish to impart it to others.* To what will this lead? Why certainly, to the effort to communicate all of which we believe others to be ignorant. None of us, consequently, ought to be blamed or ridiculed, merely for mistaking the amount of ignorance which exists in the society to which we belong—for that may even exceed our own estimate. The application which I wish you to make of these remarks (if you approve them,) is, that each member should ask himself, before every fall meeting, *"have I any thing that I myself believe to be worth communicating? If I have, it is my duty, as a member, to communicate it, without wasting a moment's consideration in determining, whether others may, or may not deem it worthy of notice."*

Let me beg you to consider *another thing*—your duty; this is, to exert your influence to increase the number of our members—*not of such as are with us one day, and off the next—of such as join for their own paltry views of petty gain*—but of men sincerely devoted to the great interests of Virginia agriculture, and earnestly desirous to promote them by all the legitimate means in their power. Especially, let this influence be exerted to persuade our non-subscribing friends of this town to join us, and abide by us, "through good and evil report;" for nothing is more demonstrable than that *they* have a more direct and immediate interest in promoting our institution, although not generally agriculturists, than we have who are not residents of Fredericksburg. What is that demonstration? Why that every thing which annually, or indeed, at any time, draws a great additional number of persons to this place insures almost to every dealer in the town, a certainty of making a sufficiency of additional sales to pay much more than it would cost him to become a member of our society. Again; if the labors of our society avail any thing towards making *us* of the country better farmers—our ability to pay to the citizens of this place old debts, and to contract new ones, will be incalculably enhanced.

While I am on this subject, of new members, permit me to remark, that nothing has occurred at any of our meetings which has given us more pleasure, than that a lady should have yesterday become a member of our society. Not a few wishes did I hear expressed, that her laudable example should be followed by many of her sex, who, like her, have the sole management of farms—however they may, at first view, be deterred by the novelty of the case. We have only to embrace horticulture (and why should we not?) among the objects of our society, and *then* even the most fastidious of either sex could raise no objection, on the score of *custom*, to ladies becoming members; for nothing is more common than horticultural societies, which so much augment the comforts of life, consisting principally of ladies. Who so proper, too, as they are, to judge of domestic manufactures, which all the agricultural societies of our country profess a desire to promote? In short, it is to *that sex*, as I have ever thought, to which we must all look—whether as single or associated individuals—for our most effectual aid "in every good word and work," and therefore, should not only hail it as a happy omen of success, when any of them, distinguished as this lady is for her good qualities, volunteer to assist us in what we ourselves believe to be a laudable undertaking, but should invite their co-operation. None, I think, but the strainers of gnats and swallowers of camels can object to it.

I have stated that the kind of members which it is most important for us to obtain, must consist of men sincerely devoted to the great interests of Virginia husbandry, and anxiously desirous to promote them by all the legitimate means in their power. Of such men, let me here testify, (and high is my gratification in being able to do so,) that we have always had, from our commencement, 17 years ago, an ample number to keep our society in constant operation, which cannot be said of any similar institution in our state. Most true it is, that we have several times been in a languishing condition; and, on one or two occasions, have almost despaired of keeping the society up; but the patriotic maxim of one of our most gallant and estimable fellow citizens—*"never give up the ship"*—kept us in heart, until *here we are*, with renovated and confident hopes, that "The Agricultural Society of Fredericksburg," will long—very long survive the oldest liver among us. Let us make it like old wine, which is known to improve both in quality and value, with every year that is added to its age. Let us make it, as we certainly may—what is far, very far superior—the means of improving the social and moral condition of all who are connected with it, or within the reach of its influence. This, by contributing to demonstrate what Virginia farmers and planters can accomplish on the good old soil of their forefathers, will do more than any thing else to check that mad spirit of expatriation which is desolating our homes and fire-sides like a raging pestilence.

AGRICULTURAL CONVENTION.

This body met on the day appointed, and in the manner proposed in the last and previous numbers of this journal. Delegations were present from only two agricultural societies, those of Albemarle and Fredericksburg, and from two popular meetings, the one in Albemarle, and the other of James City and York counties. But however desirable were such appointments, as evidences of interest felt for the objects in view, by entire bodies or portions of the community, the plan of the convention as previously proposed, and repeatedly notified to the public, embraced every person belonging to the agricultural interest, whose zeal for the cause should induce his attendance and participation in the proceedings. The juncture was peculiarly favorable for the assemblage being large, and composed of agriculturists from every part of the commonwealth. In addition to the session of the legislature, and the other usual causes which draw persons from all parts of the state at this season, there were members of three other conventions, besides the agricultural, which served to add to the latter, both in numbers and talents, from remote parts of the state. The proceedings of the Agricultural Convention attracted much attention. The last session was numer-

ously attended,and the proceedings were listened to with apparent interest—and though the memorial was not read until at the close of a sitting of three hours, there remained present at the late hour of 10 o'clock from one hundred and fifty to two hundred persons, when the final, and unanimous, vote of adoption was taken. All persons present had been informed that their participation was invited, and that unless dissent was expressed, all present were considered as members of the convention. If the object of the meeting should be in any measure gained, by obtaining legislative enactments in aid of agriculture, it will be a novelty in the policy and usual procedure of Virginia, that will greatly surprise as well as gratify those who have most zealously urged and aided this effort. But however feeble may be the hopes entertained for legislative action, there is better reason now for their being kept alive, than merely the respectable character of the late convention, and its wishes, alone would authorize. This reason is, that it has become apparent to every thinking man, that the agricultural and general interests of Virginia are in the *utmost need* of all the support that her government and her people can give. That *something must be done for relief*, seems to be the opinion entertained by every one—unless our legislature is to present an all-important exception. If this should be the case indeed, the legislative history of Virginia will present a parallel case to the closing scenes of the Greek Empire—when the people, and their rulers, seemingly forgetful that the Turks were thundering at their gates, were divided into implacable opposing factions, and engaged in disputing on metaphysical subtleties, or religious differences, of which nobody could understand the meaning.

The journal of the convention, and the memorial adopted, are given below. The address of the President of the convention, (which was delivered at the request of the general committee in their meeting of the previous day,) we hope to obtain a sketch of for future publication.

PROCEEDINGS OF THE AGRICULTURAL CONVENTION.

At a Convention of delegates from the Agricultural Societies of Albemarle and Fredericksburg, and from public meetings in the counties of Albemarle and James City, and also of a number of other individuals belonging to the agricultural interest of Virginia—held in the Senate Chamber in the City of Richmond, January 11th, 1836—

On motion of Mr. Craven of Albemarle, James Barbour of Orange, was chosen President of the Convention.

On motion of Mr. Richardson of James City, Edmund Ruffin of Petersburg, was chosen Secretary.

On motion of Mr. Cabell of Nelson,

Resolved, That a committee be appointed by the President for the purpose of considering, and recommending such measures as may be deemed most proper for the adoption of the Convention.

Messrs. Cabell, Ruffin, Randolph of Albemarle, Semple of Spottsylvania, Hairston of Henry, Gooch of Henrico, and Craven were named as the Committee—to which, on motion of Mr. Cabell, the President was added, as Chairman.

On motion of Mr. Randolph,

Resolved, That the President may add hereafter to the Committee any other names, so that the whole number shall not exceed thirteen.

To give time for the Committee to act the next day, the Convention then adjourned to the evening of the 13th inst. at 7 o'clock.

Wednesday, Dec. 13th.

The Committee met, according to adjournment, in the Hall of the House of Delegates. Messrs. Garnett of Essex, Richardson of James City, and Fontaine of King William, had been previously added to the Committee.

The President addressed the Convention at length, in explanation and support of the general measures proposed for legislative aid to agriculture, and especially those recommended by the Committee.

Mr. Garnett presented the following Report and Resolution from the Committee, together with a Memorial to the Legislature, praying for aid to the increase and diffusion of agricultural knowledge—which were read, and then severally adopted by the Convention *unanimously*.

The Committee to which was assigned the duty of reporting on such measures as in their opinion it would be proper for the convention to act upon, beg leave to recommend the accompanying memorial to the favorable consideration of the convention, as containing just and general views of our necessities, and the remedies it would be proper to recommend; and should the memorial be approved by the convention, that a committee of four be appointed, to be composed of such members as can perform the service, to take charge of the memorial, with a view to present it to the legislature, and to attend on such committee as it may be referred to, to give the explanations that may be required.

Resolved, That it is recommended by this body, that an Agricultural Convention shall again meet in the city of Richmond on the second Monday in January 1837, to be composed of delegates from the several Agricultural Societies in Virginia, and from any public meetings of members of the agricultural interest, in counties and towns where no such such societies have been organized.

After the adoption of the memorial, Messrs. Randolph of Albemarle, Gooch of Henrico, Ruffin of Petersburg, and Peyton of Richmond, were appointed the Committee to lay the memorial before the Legislature.

The Convention then adjourned *sine die*.

The Memorial of the Delegates from the Agricultural Societies of Albemarle and Fredericksburg, and many other persons interested in agriculture, from various parts of the State, to the Legislature of Virginia,

RESPECTFULLY SHOWETH—

That the present condition of Virginia husbandry in general, and of her agriculture in particular, imperatively requires every effort which the wisdom and patriotism of your honorable body can exert in their behalf; that for want of legislative aid, although blessed with a soil, climate, and

other natural advantages far beyond most of our old sister states, *we* decline in a degree as alarming as it is rapid, while *several of them* rise continually in relative prosperity and importance, as members of our federal union; that thousands of our fellow citizens, in utter hopelessness of bettering their condition in their native land, are abandoning the beloved homes of their nativity, for new and strange homes in "the far west;" that this expatriating epidemic is spreading with such fearful rapidity as to threaten the almost entire depopulation of extensive neighborhoods, once the garden spots of Virginia, unless something can speedily be done to arrest its ruinous progress; and that, for *this something*, we who will not yet "despair of the commonwealth," confidently look to *you*, our representatives—to *you*, the legislators of the land, who as certainly have the power, as we hope and trust, the desire also, to do for the vital cause of agriculture, all that we shall ask. Think not, we entreat you, that we are about to petition you for ourselves alone, it is for the best interests of our own dear state, and for the adoption of the only means left, (as we believe,) of rescuing her from that depopulation and political atrophy brought upon her by her own shameful neglect of all those natural advantages with which an ever bounteous providence hath so abundantly blessed her.

The facts which we have stated are too notorious to be denied, too manifest to pass unnoticed, even by the most careless observer. But their causes are not so obvious nor so recent, as to be well understood without an attentive retrospect into by-gone times.

Our ancestors generally, like all persons who live in countries wherein the means of subsistence are easily procured in superabundance, seem never to have looked forward to days of comparative scarcity, but wasted, in profuse and luxurious hospitality, the time, the industry, and the resources which should have been employed, *at least in part*, to secure pecuniary independence for themselves and their posterity. We say not this to censure those whom we have so much cause to venerate and love, but merely as the statement of an important fact, which would be equally true of ourselves, could we be placed in a similar situation. *We*, their children, thoughtlessly trained up in the same habits, unwarned of our inability to indulge them to the same extent, have pursued a similar course. With means continually, inevitably diminishing by the constant subdivision of property, without any proportionate reduction in expenditure, we opened our eyes too late, to the startling fact of rapid decline, both in private wealth and state influence. Our commonwealth, once confessedly the first in the union—our beloved old state, who once gave away a principality for the preservation of that union, has lived to see the day when some, (we will not say which,) who gave *nothing*, together with many of the very receivers of her bounty, are jeering and taunting her with her comparative weakness. We would scorn to urge this by way of complaint, but we do it to rouse our fellow citizens, if possible, to a closer attention hereafter to our own state interests.

What aggravates much the evils of which we complain, is that, although our eyes are now wide open to the evils themselves, too many of us seem still utterly blind to the causes which have produced them. Thus you will find thousands most fatuitously ascribing them to our lands, our slaves, our geographical position; in short, to *any thing*, rather than to the causes just mentioned, and to our own habits of comparative indolence and improvidence. These, so long as they prevail, must continue to render useless every natural advantage that we either do or could possibly possess. We seem entirely unaware, that these deadly poisons of every community can never be cured by mere change of residence, or simply, by substituting the culture of cotton, and the sugar cane, for that of corn, wheat, tobacco, or any other staple of the old states. We either forget, or have never learned, that *without* increased industry and economy, the opportunity alone to make money will never cause its accumulation; but that with these indispensable qualities to the acquirement and preservation of wealth, even very *inferior* advantages of soil and climate will be more available than the richest lands the sun ever shone upon, to secure all the comforts, conveniences,and enjoyments of life, that rational men ought to desire. That we still have two of the indispensable prerequisites to the fruition of every blessing derivable from government, cannot be truly denied; prerequisites without which the wealth of the Indies would be totally insufficient to secure temporal happiness. These are, a public sentiment and moral force, fully adequate, and at all times desirous to maintain the majesty of the laws. We have a civil power too, fully competent to punish, in the most exemplary manner, all who violate the same, or commit outrages of the kind, either against the peace and order of our community, or the rights of its citizens.

In offering these remarks, we mean to make no invidious insinuations against such of our new states and territories as are continually receiving accessions of citizens from Virginia; let these emigrants themselves inform those whom they leave behind, whether they have changed for the better or worse, so far as regards the conservative influence of public sentiment over morals and manners; the exerted power of the laws of the land; and the efficiency of the civil authority in compelling obedience to them.

We most solemnly assure our friends and relatives, who have lately left us, as well as the long settled and native citizens of the "far west,," that we feel not the slightest inclination to exaggerate, or "set down aught in malice," against the land of their choice. Its prosperity must always be a source of gratification to us, for their sakes, however we may individually suffer by some of the means of its promotion. If we have heard false acounts of their state of society, let them undeceive us; let them give us the truth; and should it prove that we have been misinformed although our opinions are derived from their own public journals, we will cheerfully retract, however we may lament the consequent breaking up of families, and the loss to Virginia of more of her best blood. We mean not to harm others, but merely *to be true to ourselves*. In doing this, we shall always deem it our duty to assert and maintain, until better informed, that life, liberty, and property, (the possessions which government was formed to protect;) are *yet* more secure in most of the *old states*, than in *several of the new*, or in our territories: that the land of our nativity, drooping and care-worn, and depre-

ciated as she is, may still be found all-sufficient for the happiness of her dutiful and affectionate children: that they are under no political nor moral necessity to desert her: and that all true Virginians who will abide by their parent state, in all the vicissitudes of her fortune; who will determine to aid with heart and hand developing *all her resources*, will promote, not only *her* welfare, but their *own*, much more effectually, than by a precarious search after the latter in strange and distant lands.

It is certainly true, that by abandoning our native homes; by tearing asunder all the domestic ties of early youth and mature age, we *may possibly* find, in some of our new states or territories, greater immediate opportunities of *making money*. But most of us must undeniably do this, at greater risk both to health and life: to the first, from a worse climate in general: to the second, from the additional danger of want of power in the civil authorities, as yet, to afford it adequate protection. The newspapers in most of the new states and territories, abound with uncontradicted proofs of this fact. Grant, however, that the opportunities have actually been found, while health and life remain unassailed, they will prove utterly unavailable, unless the emigrants also abandon and tear away those fatal habits of indolence, profusion and improvidence, which, in very many cases, have produced the supposed necessity for emigration. Whether increased facilities to get rich, and the actual acquisition of riches themselves, will also increase our power to conquer those bad habits which have forced many to expatriation, is a matter well worth the most deliberate reflection of all who are about, but have not yet finally resolved, to turn their backs on home, friends and kindred, for the sake of the single object—wealth. The desire itself we admit to be laudable, provided the motive be—to render our posterity free, independent and happy. But the wiser and more certain course to accomplish our purpose, is, in our opinion, to qualify them by thorough education, to choose for themselves the means of its attainment. To give our children money, will prove a blessing or a curse, according as they use it; but give them morals, manners, useful knowledge, industry and economy, and we may rest perfectly well assured that they will never misapply wealth in many of its forms, whether it be acquired by inheritance or purchase. Pardon this digression, and permit us to resume our efforts to develope the causes of our present depression.

The legislatures, in the early days of our commonwealth, seem never to have deemed it any part of their duty to go much beyond matters of mere local legislation and state police. Hence, the pernicious hallucination still to be found among us, that they really have no power to do more; as if to promote the general welfare of Virginia by popular education and internal improvements, were not quite as much a matter of legislative duty as taking care of oysters in the waters of the Chesapeake—prohibiting fish-traps in navigable streams, and preventing hogs from running at large in petty villages and towns. *Popular education*, that indispensable basis, that *life blood* of all republican government, without which it can have no healthful, no permanent existence—and *internal improvement*, the all-essential means of its prosperity and preservation, seem never for a moment, in those days, to have been thought fit subjects of legislative deliberation. A school to which every citizen could not send his own child, a road, or bridge, or canal, that each could not use himself, were looked upon, it seems, as contraband articles in our legislative halls. Even *now*, the attention of our legislators to these great objects of national interest and regard—these all-important elements of state welfare and influence, falls far short of their requirements.

Another most prolific cause of our fallen condition is, that at a later period of our political history, commencing with the presidency of the first Mr. Adams, and extending, we will not say how near, to the present times, our legislative watchmen have been looking more abroad than at home, for subjects to act upon. The selfish and demoralizing conflicts of political parties, their victories and defeats, always achieved or suffered at some sacrifice of true republican principles, by strengthening the ability of the conquering party to abuse power with impunity, together with the making and unmaking of presidents and vice-presidents of the United States, appeared to be deemed much more important matters of state policy and interest, and more effectual means of maintaining our just rank, our relative influence in the union, than the making and unmaking of state laws, or the speedy developement of all our internal resources and natural advantages, to the utmost possible extent. Instead of its always being made a primary question at our annual elections, who, among our candidates, were best qualified to promote these vital objects, inquiries totally irrelevant—inquiries solely into party qualifications, have, for years past, been almost the only ones ever made. This most inconsiderate and fatuitous course has been a source of unceasing exultation to all those wily politicians in our sister states, who, envying our position at the commencement of our federal government, as head of the union, adopted a much more rational system of state legislation, for elevating themselves to our level, and finally, for soaring far above us in regard to all the most effectual means of real political aggrandizement. Our truly ridiculous state pride—ridiculous because content with ancestral achievements, instead of being stimulated thereby to noble deeds of our own, has aided our rivals much in their efforts for supremacy in our union—for this pride, self-satisfied, and consequently disdaining even to examine for a moment, its means of subsistence, has been feeding upon its own inanity whilst they were accumulating in their elementary schools, in their colleges, by their roads, canals and agricultural societies, real and substantial materials for the only species of exultation which true patriots, real, devoted friends of our union should ever permit themselves to feel. Give us, we entreat you, us who rely upon you to save our state from ruin—give us the same just grounds for exultation, and our children yet unborn, will bless you for the deed.

The fatal consequences of our course might easily have been foreseen and avoided, had not our party prejudices and passions been so aggravated and maddened by constant indulgence, as entirely to blind our judgements to the true interests of Virginia. These consequences are now deeply felt in the very vitals of the state. Large bodies of our citizens are daily fleeing from their native

homes, as if they dreaded to be starved to death, should they remain in them longer, whilst those who are left behind, are plunged up to the ears, (all of which are stopped, except to their own confederates,) in reckless political strife, about matters over which they can rarely, if ever, have any effective control, instead of constantly and most anxiously directing all their united efforts towards the preservation of our dear old state from abandonment by her citizens and political degradation. We have only to continue our exterminating party quarrels a little longer, and we shall have nothing left to quarrel about, but the inexpiable guilt of having ruined Virginia.

To *you*, our representatives, our "forlorn hope," in this fearful crisis of our affairs, we must look for some remedy, some curative process, if any can be devised, for the evils which are now spreading over the land like an all-destroying pestilence. Listen not, we entreat you, to any who will cry, "*peace, peace, when there is no peace;*" who would fain persuade you that "*all is well:*" that Virginia is fast resuming her former political importance in the union; that her voice is still attentively heard and highly respected in our national councils, and that little more than what has already been done for education and internal improvement is required to bring back those palmy, prosperous days she once enjoyed. Rather be assured, that without *all the aid* which *you* can give her, the diseases both moral and political, under which she is now suffering so intensely, must finally destroy or reduce her to a condition of which every true Virginian must be utterly ashamed.

These are very unpalatable truths, and some possibly may blame us for uttering them, nay, may accuse us of presenting too gloomy a view of our real condition. But we verily believe, that had similar exposures been more frequently made, our legislatures never would have wasted so much of their precious time in vain attempts to regulate the affairs of the nation, when both duty and interest required them to spend by far the greater part of it in regulating our own state concerns, as the only certain means of sustaining our original rank in the union. The exercise of the latter right, none were likely to dispute, however we might differ about the mode; whereas all attempts to exert the former, have invariably resulted in aggravating our internal dissentions, and making "confusion worse confounded." In the mean time, all the best interests of our state were suffered to lie dormant, as matters that could be taken up at any time, and therefore were not taken up at all. These interminable quarrels, instead of purifying our political atmosphere, as party conflicts are said to do, by those visionary politicians who are led away by false analogies, have overspread the country with contagious moral diseases for which there seems to be no cure, nor any escape, since both the doctors and their patients are alike infected with them, and never come into contact without re-infecting each other.

Until very lately, we have almost entirely neglected the great, the vital elements of state prosperity and aggrandizement. We mean *popular education* and *internal improvement*. At the head of the latter stands *agriculture;* for, according as *that* flourishes or declines, so must all the other interests in the community also flourish or decline. Yet if there ever has been one solitary enactment designed specially to promote this first of all arts, we have yet to learn the fact.

It is certainly true, that your petitioners are all agriculturists, and may therefore be suspected of undue partiality for our own class. But we are unconscious of claiming, or even desiring more than our *real* importance, in all calculations of national good, entitles us to claim of all our legislatures who honestly make *that good* the object and test of every legislative proceeding. Always considering commerce and manufactures our natural allies, our political brethren, we have ever been ready to act towards them as such. But we know no better way of manifesting this fraternal regard, than by constantly fostering *our own interest*, as the most essential, nay, the indispensable means of cherishing *theirs*, and elevating them to the highest degree of attainable prosperity. On this deeply interesting subject, we have but one heart, one mind. Our sole and most anxious desire is, to promote, as far as we possibly can, the full developement and proper application of *all* the resources of our beloved state; to consult together, with one accord, for *her* interest, *her* permanent good; and to devote to this vital cause, all the talents, and all the knowledge we possess. Differences of political opinion in regard to federal politics we certainly have among us; for where is the hole or corner of the state into which they have not found their way? But we have unanimously resolved, (strange as it may seem,) that they shall neither disturb our deliberations, nor in any way mingle with our proceedings: Virginia resources and Virginia improvement by their fullest culture and developement, being the exclusive aim of all our present efforts. If ever there was a time, since the establishment of our commonwealth, which, more than any other demanded such efforts, the present, most assuredly, is that time: and much do we hope, confidently will we trust, that our own harmonious co-operation to resuscitate dear old Virginia, will be fully met, on your part, by far more effective exertions.

Had our legislatures, in the incipient stages of our federal union, extended their fostering care, with due solicitude, to the agricultural interests of Virginia, and to the general education of her people, we have no doubt that most of the evils, if not the whole under which she now suffers, might easily have been prevented. But it is not yet too late, we hope, at least to alleviate, if not entirely to remove them, by future legislative effort, made during your present session, and cordially sustained, as we believe it will be, by your constituents. Something, it is true, has been attempted of late years, in behalf of popular education; but we cannot forbear to repeat, that up to the present hour, nothing, nay, less than nothing, (if we may so express ourselves,) has been done for agriculture —the nursing mother of every legitimate trade, profession and calling in the community. Such, however, were the natural advantages of Virginia, that this shameful and ruinous neglect of them was slower than might have been expected, in producing all those disastrous consequences which ought to have been anticipated in time to prevent them. Hence the fact of their coming upon us, as it were, by surprise.

Some six or seven years have now elapsed, since the first unequivocal symptoms appeared of that emigrating pestilence, which has, ever since,

been spreading desolation over the land, and emptying our towns, villages, and the country at large, not only of those who might justly be called the warts and cancerous ulcers of the body politic, but of thousands of our best and most valuable citizens. Whether the fear of poverty or the lust of riches contributed most to produce this effect, it is now useless to inquire, since to whichever cause we ascribe it, the consequences have been alike fatal to our state influence in the union—alike fatal in tearing asunder all the natural ties of home, nativity and kindred.

During all this depopulating and portentous period, what, (we beg leave to ask) what have our legislatures done towards the cure or mitigation of this truly alarming state malady, so far as enactments to promote agriculture generally throughout the state could aid in supplying a cure? Why, they have appointed a committee of agriculture!! And what has that committee done? The answer possibly may be found in some of our legislative journals; it is no where to be seen in our laws; for the volume which contains them is silent as the grave in regard to all agricultural interests. This seems the more strange and unaccountable, when we reflect on the undeniable fact, that a very large majority of every legislature, since the establishment of our state government, has consisted of planters and farmers. Incompetent we cannot believe they were, nor are we willing to pronounce them guilty of treachery to their own class. But we must either do this, or suppose they must have thought agriculture not only capable of flourishing without legislative aid of any kind, but, in the exuberance of their generosity, must have deemed her followers (to borrow the comparison of an English statesman,) like sheep, always ready and willing to be sheared, even to the skin, for the exclusive benefit of others. *This* is a kind of quixotic patriotism, to the motives of which we are willing to accord all the praise it may deserve, when tested by the true principles of sound political economy; but we cannot go farther, and must protest against its adoption, as the rule of legislative action for any of *our* immediate representatives. If any sacrifice of agricultural interest be proved to be essential to the general welfare, *let it be made;* not a man of us will say *nay:* all we ask, and *that* we have a right to require, is, that the case be clearly, indisputably made out; that *we* who pay all the taxes, either directly or indirectly; *we* who thus defray all the necessary expenses of the government under which we live, should enjoy at least such a share of its protection, its care and pecuniary aid, as our relative importance to the general good unquestionably entitles us to expect.

Under these circumstances, we will not permit ourselves to doubt, that *you* to whom we look up for all the good which wise and salutary laws can procure for us, will immediately apply every means in your power to remedy the omissions and neglects of your predecessors in regard to the great agricultural interest of Virginia.

If any examples were wanting to prove that legislative aid may rightfully be given to these interests, we could confidently appeal, not only to several of our sister states, whose wise law-givers have been content *to act*, while we have been consuming months and years in fruitless debates about *the right and the mode of acting;* but we could cite the history of every civilized country under the sun. Not one of them, we believe, can be named, which has not established either agricultural professorships, or agricultural schools, with experimental farms attached to them, or state societies, or boards of agriculture, or some public institution of similar character, demonstrating incontestably, that in *all* these countries it is deemed a long settled, wise and highly essential part of nationl policy to legislate for the promotion of husbandry in each of its branches, but especially of agriculture. Even Scotland, that country which it has been the fashion of some narrow minded people to ridicule for its poverty, has distributed in the course of half a century half a million of dollars to the tillers of the soil, in the form of agricultural premiums, thereby augmenting her agricultural products to the amount of several millions of dollars. Within that period, Virginia has distributed not one solitary cent! in any way whatever, for the promotion of *her* agriculture, although until very lately, she has been almost *exclusively* an agricultural state.

What have been the consequences in all the countries referred to, of this parental, legislative care of agricultural interests? Why, that *in every one of them*, without a single exception, however inferior to Virginia in soil and climate, the condition of its husbandry in general, and especially of its agriculture, *has been* and *now is* far, very far superior to ours. From these facts, the incontestable inference is, that legislative aid is absolutely essential in every country, whatever may be its natural advantages, to the most prosperous condition of its agriculture, and that the connexion of this vital art with science, and its necessary dependence thereon, to reach its highest state of improvement, are quite as demonstrable as in the case of any other art whatever. The truth is, that this connexion between science and art—this mutual dependence upon each other, *has existed* since the world began, and *must last* to the end of it, however the pride of ignorance, and the obstinacy of folly may strive to represent the two as separate and distinct in some instances, and in the case of agriculture, as warring against each other. That such preposterous fatuity should still find any abiding place in Virginia, may be justly attributed to the absence of all legislation on the subject; for had there been any, it is scarcely conceivable that it would not have recognized the essentiality of science in agriculture, and thereby have had a most salutary effect in extirpating the contrary most pernicious belief from the agricultural portion of our community.

In our own confederacy we have the highly praiseworthy example of our sister state of New York to prove how greatly agriculture may be advanced by legislative aid; for all who have taken pains to inform themselves concur in ascribing the rapid improvement in every branch of *her husbandry*, to the establishment and operations of her state agricultural society. *Might not we Virginians* hope for at least equal advantages from a similar state institution? That we should derive still greater, we deem almost certain. First, because the interests of commerce and manufactures bear a much less proportion to those of agriculture in Virginia, than they do to the same interests in New York; and secondly, our sister state is daily *gaining* most rapidly, while we are *losing* in population, wealth, and federal influence. Consequently, any measure would tend to retard, or en-

tirely to check this loss, (as legislative aid to agriculture must do,) would be more beneficial in proportion to *us* than to *them*. We suggest this argument, not from envying their flourishing condition—Heaven forbid, since our unalterable attachment to the union, which we anxiously hope may survive all the fearful conflicts of party politics, will always lead us to rejoice in the prosperity of our confederate sisters, however we may lament our own short-sighted policy in failing to profit by their wiser course in matters of state legislation. So long as we continue a united people in honest and zealous efforts to maintain our federal union in all its purity and unrivalled excellence, so long will it be vitally necessary that we should both believe *in* and *act upon* the principle of each state's having a deep and abiding interest in the welfare of every other state. If *one* should happen to prosper more than the *rest*, either from superior natural advantages, or wiser and more beneficent laws, the true patriots and statesmen of the others, instead of fomenting causes of jealously and ill-will, should be continually cheering their fellow-citizens, in the noble race of national improvement, with the animating exhortation of—"go ye and do likewise." State influence in our confederacy may *justly be* the aim of each; but *just means alone* should be pursued to attain it: and these are *just, wise and patriotic state laws; just, wise and patriotic state policy;* but above all, *great talents* and *incorruptible virtue in the representatives of the state, in our national councils.*

Deeply impressed with the truth of the foregoing views, and thoroughly convinced of their tendency to arrest, or at least to alleviate, most of the evils under which all the best interests of our beloved state are *now*, and *long have been suffering*, your memorialists most earnestly and anxiously pray, that you will give them your immediate and most deliberate attention. Our case, we consider one of life or death—a case wherein the patient must inevitably die, unless the family physician acts with skill, promptitude, and decision.

Your memorialists farther beg leave respectfully to solicit your attention to several plans for the benefit and improvement of Virginia agriculture, either of which, in our opinion, would soon cause her poor and desolate fields to assume quite a new aspect. Were one or more of these plans adopted, you would inspire hope where none now exists—you would revive that which is nearly extinct, and would call forth, by the certainty of legislative aid, that enterprise and exertion which alone are wanting to accomplish a great and most salutary change. *This*, if *any thing*, would effectually check the desertion of our fellow-citizens, now so rapidly leaving us forever. Many, without doubt, would still seek distant lands to mend their ruined fortunes; but more, we verily believe, would attempt to ascertain, with greater certainty than they have done, the chances of disappointment, while still a greater number would cordially embark their all with that patriotic band who have pledged themselves never to give up the good old ship Virginia, while there is the most distant hope of rendering her once more sea-worthy, but to sink with her, (*if sink she must*,) rather than suffer her to be wrecked, merely for want of a sufficient number of strong hands and resolute hearts to man her in the hour of distress, and save her, if possible, from utter destruction. Most true it is, that formidable dangers threaten her from various quarters; alarming breakers and whirlpools appear on almost every side, and steer as she may, escape seems hardly practicable. But with so gallant and skilful a crew as she *once* had, in revolutionary times, and as she *might have again*, (for their indomitable spirit still animates many of their descendants,) she may yet resume her place, and hold on her course amidst the bravest and the best, after weathering all the storms she *has had*, or *may have* to encounter.

To some of your honorable body, this may possibly papear to be the pitiful language of political cowor the still more despicable slang of selfish alarmists, who will address you in *any* terms, whatever, that may subserve their own exclusive interests. But confident as we are in *your ability* to discriminate, and *in the unalloyed patriotism of our own views*, we will most cheerfully submit to *your* determination in regard to the prayer of our memorial.

One of the plans which we beg leave to propose, is the establishment of an agricultural professorship in our University, *never to be filled by any but a scientific and practical agriculturist*, with a salary of $1,500, to be paid out of the unappropriated balance of the literary fund; and in connexion with this, an experimental farm of one or two hundred acres, to be purchased with the same fund; upon which farm the pupils of the professor should be required, as a part of their duty, to labor a certain number of hours every day. Such an institution would furnish, in a few years, a body of hardy young men, skilled both in the theory and practice of agriculture. They would be qualified, at once to become proprietary cultivators of farms, or managers of them for others, instead of spending a large portion of their lives in acquiring the little knowledge they usually possess of such matters, when, by *our* plan, they would have ready for use, all that was necessary, the moment it was called for.

Your memorialists further suggest, that should the experimental farm be established, a fine opportunity would be furnished to redeem the pledge given at the creation of the literary fund, which was, that a youth of good moral habits and intellectual promise, but too poor to educate himself, should be selected from each senatorial district by the entire delegation in both branches, and placed at the University, as the adopted children of the commonwealth. These youths, together with the other pupils of the professor, would furnish all the labor necessary to conduct the farm, and yet have ample time to acquire great literary attainments. By this course, such a number of young men would be redeemed from ignorance, and possibly from vice also, at the same time they would be rendered virtuous and intelligent, as greatly to add to the general intelligence, and prove invaluable in disseminating agricultural knowledge. By such a feature in the administration of the University you would at once destroy the chief ground occupied by its enemies, that it is an aristocratic institution; and in relieving it from the prejudices excited against it by this outcry, you would unite both high and low, rich and poor, in its cordial support.

Another plan is, to establish a state agricultural society, or board of agriculture, somewhat similar to that in New York, to consist of one member, a

practical agriculturist, from each congressional district; that their duty should be to meet annually on the same day with the legislature; to sit only weeks, and to receive the same pay for the time as the members of the legislature, to which they should always report, before adjournment, on all such matters as they might deem worthy of legislative action.

A third plan, which in our view promises equal, if not superior advantages to either of the foregoing, is to employ a competent person, with a sufficient salary to defray all necessary expenses for two years, whose duty it shall be to make an agricultural survey or critical examination of all the best cultivated parts of the Atlantic states; and to make a written annual report to the legislature of all the most approved methods within each state, of clearing, draining and fertilizing land; of cultivating, harvesting and preserving the staple crops of the same; of improving, rearing and keeping farming stock of every kind; together with a particular description of all the best agricultural machines and implements. This would form a body of husbandry as valuable to us Virginians, as the Husbandry of Arthur Young, and the Rural Economy and Agricultural Surveys of Marshall, made under an appointment of the English board of agriculture, proved to the agriculturists of Great Britain. That *her* agriculture has flourished more, beyond all comparison, since the publication of those works, than it did for double or quadruple the time before, is a fact universally acknowledged by all who are well informed on the subject; and that a similar work would produce similar effects with us, cannot, we think, admit of a doubt. It would soon be in the hands of every farmer and planter who reads with a view to improve in his profession; state pride (so often misdirected and misapplied,) would aid them in using it for good purposes; and it would prove a highly useful manual to young and inexperienced agriculturists, not yet too wise in their own conceits to profit by "*book-farming*," as it is contemptuously styled by many of those who can scarcely read the works which they most foolishly affect to despise.

At present we have no agricultural work similar to those to which we have referred, nor any thing, indeed, comparable with them, although no imaginable reason can be offered why we should not have them. It is true we have several very valuable agricultural papers, among which we take a pride and a pleasure in naming our own Virginia Farmers' Register. But the information these papers contain is necessarily very miscellaneous; often of little or no importance; insulated and diffused at different times over so wide a surface, and mixed up too with so much irrelevant matter, that to form a connected system of husbandry out of the whole, properly arranged under distinct heads, would be a labor that very few men, if any one, could be able and qualified to perform, not to insist upon the fact, that *none* of these periodicals can possibly have yet published all that is known and beneficially practised by the best farmers and planters of the United States. A work of the kind would immediately make every one who read it acquainted with all the improvements in every branch of husbandry throughout the most highly cultivated portions of our country; whereas, for the want of some such publication, some such authentic record of the progress of agricultural science and practice, we find many parts of Virginia, not very distant from each other, almost a century behind other parts in these highly important matters, and still more behind some of the northern and eastern states. All who have travelled through these states within a year or two past, know the foregoing statements to be true to the very letter, however mortifying and degrading the fact may be in the estimation of every true-hearted Virginian.

Is it not, therefore, high time that we should take shame to ourselves in regard to the present condition of Virginia husbandry? If ever it is to be done, "*now* is the accepted time." But to your honorable body we must look—to *you* we must most earnestly appeal to create and apply the necessary stimuli for rousing us from the deadening lethargy which has so long paralyzed all efficient desire for improvement in the *only things* which can save our state from sinking to the very bottom of the federal scale, after occupying for so many years the high standing which she once did. These things, we must again repeat, are *popular education* and *internal improvements* at the head of which stands *agriculture*. They should be simultaneously carried on, because their action is reciprocal and because they are absolutely essential to the general good, as well as to the purity and preservation of all those republican institutions, to establish which, our venerated patriots of the revolution shed so much treasure, so much blood.

All which is respectfully submitted.

JAMES BARBOUR, Pres.

Edmund Ruffin Sec'y.

For the Farmers' Register.

SOME OBSERVATIONS ON THE GOOD EFFECTS OF COVERING THE SOIL.

Wardsfork, Charlotte County.

I hold it as a fact, within the reach of the most inattentive observer of nature, that covering soil increases its power to produce. I showed in a former communication, the good effects of covering against the action of frost: I will now, in the first place, endeavor to show that the covering of soil prevents the bad effects of beating rains. It is unnecessary to prove that the land is run together by beating rains, and that this running together gives an evident check to the growth of the crop. Whether this effect is occasioned by closing the pores of the earth, or by preventing the inhalation of invigorating properties from the air; or by stopping the rise of moisture from below; or by preventing the easy extension of roots—such is the fact. It is equally clear to me, that covering the soil will prevent the above mentioned injury—for it may be seen where litter is thrown over the surface of the ground, the soil underneath is kept in a soft, mellow state, peculiarly prepared for production. Let a vine or weed find its way through this litter, and how rapidly and luxuriantly it grows. Compare these with vines or weeds growing on the adjacent ground! When a hasty rain falls on grass or weeds or litter, the drops of course strike the covering first, and their force is broken, and the water only trickles into the earth. The more gradually the ground is made wet, and the lighter the drops, the less it runs the land together.

Now, since covering prevents running together —and this injures the crop—it must be a good thing to cover the soil against this bad effect of beating rains.

Secondly; covering is also a protection against the pressure of the hoof—and I would add, it is injured more or less, in proportion to the quantity of the litter—more in the spring and summer, than in the fall; land newly turned out more than that which has been resting; poor land more than rich; old land more than newly cleared, as the roots in the latter, prevent the effect. The truth of the first proposition in this paragraph, will not be disputed by any one—and the others are plain inferences from the first.

Thirdly; the moisture that constantly rises from the pores of the earth, which I would call the *earth-sweat*, is retained on its surface, by covering, which prevents evaporation. This may be seen, by putting down a plank upon the ground and letting it remain but a short time. May not this perspiration of the earth contain something that contributes to the growth or health of the plant? I have observed that a very slight cracking over with the hoe, so as merely to open the pores, produced fine effects. At any rate, the retaining of this moisture, by covering, keeps the skin of the earth (if I may use the expression,) supple—and plants, which resemble hair of the human body, grow better. And observe, when the soil is made close by heavy rains, the hoof, or any other cause, it breaks up in clods, and a great part of the soil is in an inactive state—and until they are pulverized, remain dead capital. These clods have often reminded me of the worthless and idle part of the community, whose room would be better than their company, unless they could, by some pulverizing process, be brought to assimilate with the active mass of our population.

J. R.

EXTRACTS FROM THE REPORT OF THE GEOLOGICAL RECONNOISSANCE OF THE STATE OF VIRGINIA, MADE UNDER THE APPOINTMENT OF THE BOARD OF PUBLIC WORKS.

By William B. Rogers, Professor of Natural Philosophy in the University of Virginia.

TERTIARY MARL REGION.

The extensive area embraced in this division of the state, though presenting comparatively little diversity in external aspect, includes strata, which by their fossil contents, unequivocally refer themselves to two distinct geological periods, though they are all without doubt comprised in the general class of tertiary formations. Adopting the names which have been recently applied in Europe to parts of the tertiary series, to which the strata referred to may be regarded as probably equivalent, though without implying any conviction on our part, that such equivalence is in general to be expected in the two continents, we shall indicate by the term *Miocene* the strata which occur in the eastern and greater portion of this region, and from which the ordinary shell marl is procured, while we will apply the name *Eocene* to the deposite of an older date existing beneath and west of the preceding, containing fossils of a different character, and characterized by the prevalence in considerable proportion of the peculiar mineral called *green sand*.

The first of these, or the *Miocene marl district*, comprehends all the area from the seaboard or water boundary of the state on the east, to a line conceived to be drawn through Northbury on the Pamunkey, and Coggin's Point on the James River, in a direction nearly meridianal, but through what precise points, further observations are necessary to determine.

The other or *Eocene marl district* is comprehended between the imaginary line above described and another line passing from the mouth of Acquia creek, through Wales, at the junction of North and South Anna Rivers, and thence through City Point, and further south in a direction not yet precisely ascertained. Much of the district here defined exhibits Miocene as well as Eocene marl, the former being found either in highlands remote from the rivers, or in the superior parts of the river cliffs overlying the latter. The localities above named were selected as points marking the eastern boundary of this region, because at those places the Eocene marl was observed to disappear below the water line by a gentle dip to the east. Its existence extensively beneath the Miocene district may be looked upon as highly probable, though under what circumstances as to depth and inclination of the beds, we have no positive data to determine.

Miocene marl district.

In the most eastern portion of this division of the tertiary, the general level of the surface is but little elevated above tide. The country is a uniform flat, in some places subject to be occasionally overflowed. The rest of the region in question has an elevation above tide, varying from twenty to eighty feet. But few points, however, in the district have a level corresponding to either of these extremes, and by far the larger portion of the surface preserves a height of from forty to fifty feet.

The surface of this more elevated portion, though preserving a general level of remarkable uniformity, is deeply channelled by innumerable ravines. The smaller of these connect themselves with large ones, and these with the wider and deeper excavations forming the beds of the creeks flowing into the neighboring rivers. The system of ravines connected with one river are separated by a narrow central tract from those connected with the next, and in a general view of the district, these systems present the appearance of mere creeks or inlets subordinate to the great rivers by which this region is broken into peninsulas. The number and extent of the large rivers and the navigable streams of this portion of the state, constitute the most inestimable of its natural advantages. The numerous creeks indenting its peninsulas furnish the cheapest and readiest avenues for a commerce which comes home to the abodes even of its rural inhabitants, while its surface scooped into ravines and its river cliffs washed by the tides, disclose the rich materials which are hereafter to bestow the highest rewards upon its enterprise, by spreading fertility and wealth to its remotest boundaries.

The superficial stratum of the region we are describing is an argillaceous and ferruginous sand of

a yellow and sometimes of a reddish color, in which are occasionally found at or near the surface, pebbles and small boulders of sandstone, rarely as much as six inches in diameter. The nature of these boulders would indicate that they were most probably derived from the sandstone formation, which ranges along the eastern boundary of the primary ridge. In some places this stratum consists of little else than a white silicious sand; in others, the admixture of ochreous clay is so considerable as to furnish a suitable material for the manufacture of bricks.

Beneath this superficial layer, beds of a very argillaceous clay occasionally occur, sometimes of considerable depth and extent, and of a texture to be useful in puddling. Its color is various, being in some places a dark blue or green, in others a bright red, or dingy yellow. Wherever found its upper boundary is remarkably even and horizontal; but where it rests upon beds of fossil shells, its lower limit conforms to all the irregularities of surface which those beds usually present. Its appearance, in some places, is that of a steep, almost perpendicular wall of smooth surface, and divided by very narrow lines running horizontally. These narrow lines, at a distance of from five inches to a foot asunder, are formed by a more ferruginous and silicious clay. At Bellefield on the York river, seven miles from Williamsburg, this deposite may be seen overlying the stratum containing shells, in some places, having a thickness of from twelve to fifteen feet, and then gradually fining out and passing into a light colored and coarser mass. The upper surface is horizontal, and the lines of division above alluded to are perfectly parallel and regular. The lower surface of the clay conforms to that of the shell stratum upon which it rests. In many places these argillaceous beds consist of a yellowish clay, beautifully variegated by streaks of red and blue. In some places there exists a slight impregnation of alum and copperas in these beds of clay. This is particularly the case in some localities on the Rappahannock and the York and Chickahominy rivers. The proportion of these ingredients is however not sufficiently great to entitle these strata to attention in an economical point of view, although it is fully sufficient to impart a very ungrateful flavor, and perhaps some useful medicinal properties to the springs and wells of the neighborhood.

A thin stratum of red ferruginous stone, containing a large portion of oxide of iron, is found in this region running horizontally below, and sometimes in the beds of clay before described, and generally separated by only a few feet from the underlying masses of shells. This stratum, which is very generally present, varies in thickness from an inch to a foot. Its texture is sometimes cellular, sometimes compact and fibrous, like that of certain varieties of hematite. In the more eastern portions of the Miocene district, the peculiar structure of which will be hereafter described, much ore of this description lies loosely scattered on the surface; while in the more elevated parts of the country, its invariable position is such as above described. The character of the ore in many localities is such as to promise great facility in reducing it to the metallic state, together with a large per centage of resulting metal. A specimen obtained from above the marl on the cliff at Mount Pleasant, Surry county, yielded by analysis in the 100 grs.

per oxide of iron,	72.40
allumina,	3.90
silica,	7.71
water,	14.35
	98.36
Loss	1.64
	100.00

With a sufficient supply of ore like this, accompanied with the advantage of a shell limestone sometimes beautifully crystalline, in its immediate vicinity, the manufacture of iron would promise a high degree of productiveness; and it is by no means improbable that in some parts of this region the supply of the ore may be found sufficient to make such an enterprise not only safe but profitable. The subject is at all events worthy of some attention. Indeed it appears not a little surprising that this rich mineral seems hitherto to have escaped observation, or at least to have been regarded as undeserving of an especial notice.

In some places, as for example, in Essex county, chiefly upon the ridge land, beds of a ferruginous sandstone are found of sufficient extent to be used as a building material. This rock is not to be confounded with the sandstones which occur some distance to the west of this, on the borders of the primary region; but it is to be looked upon as in the case of a very similar material, recently made the subject of minute inquiry by my brother in New Jersey, as a remnant or outlying portion of a once somewhat extensive deposite of ferruginous gravel and conglomerate, which by subsequent denuding action has been almost entirely removed.

The matter which in most cases rests immediately upon the shells, is a yellowish brown sand, frequently containing a large proportion of clay. Throughout this mass, and often extending to the distance of five or six feet from the shells, particles of green sand, or the silicate of iron and potash, are more or less abundantly disseminated; and in the immediate vicinity of the shells, these particles are generally condensed into narrow stripes conforming in flexure to the irregularities of the bed beneath. Even where a deep hole exists in the layer of shells, the stripes of green sand are seen still following the depression and rise of the surface, and preserving a uniform distance from it. Sometimes these thin layers are so much indurated as to have almost the appearance of stone. In none of the strata above described have fossils of any description ever been discovered.

The materials with which the shells are intermixed, or in which they are embedded, have various characters. In some cases they consist principally of a nearly white sand; in others the argillaceous matter greatly predominates, and the mass is a somewhat tenacious clay. Frequently much oxide of iron is mingled with the earthy matter, and giving it more or less of a yellow or brown appearance, and this is the aspect which the upper beds containing shells most usually present. Very generally the lowest visible fossiliferous stratum is composed of a green silicious sand, and a bluish clay, which being always very moist, is soft and tenacious, and presents a dark blue or

black color. At the base of the cliffs on the James and York rivers, this stratum may be traced continuously for considerable distances, rarely rising more than two or three feet above the level of the water, and presenting an even horizontal outline. In the deep ravines, and low down in the banks of shells, generally, throughout this region, a similar dark bluish green argillaceous sand is observed, enclosing frequently a great number and variety of shells. This constitutes what is usually denominated *blue marl*, which from the soft condition of the shelly matter which it contains, as well as the predominance of clay in its composition, is found peculiarly beneficial when applied to the more arenaceous varieties of the soil. Many highly valuable marls extensively in use are of this description.

The very general existence of the lower stratum, above described, forms an interesting and prominent feature in the geology of the Miocene Tertiary districts, as well of eastern Virginia as of Maryland. Throughout all the upper fossiliferous strata, as well as in the argillaceous beds just mentioned, will be found disseminated, greenish black grains of *silicate of iron and potash*, identical with those already described as existing in the stratum immediately overlying the shells, and having the same form and composition with the granules contained very abundantly in an older formation, both in this country and in Europe. In some beds of the marl or shells, these particles so much abound as to give a very decided color to the whole mass. In specimens from James City and York counties, as much as thirty-five per cent. of the green sand has been found, and occasionally shells are seen filled with this substance almost alone.

The surface of the strata containing shells is usually irregular. Sometimes it rises abruptly, in the form of a hillock, then it is scooped out into depressions of a few feet in depth. These irregularities, however, are apparently of two kinds; the one the original form of the deposite, the other produced by denuding action upon the surface. Thus in many places the same stratum may be remarked, rising with more or less abruptness, then again descending, and perhaps preserving a nearly horizontal line for some distance, marked at its upper surface by a clear and unbroken outline, and presenting no indication of violent abrasion from above. In other places, and this is a very frequent occurrence, deep and irregular furrows and cavities are seen, such as would naturally arise from the action of the currents and eddies of a large mass of water in rapid movement. Whether from this cause, or from the gradual dissolving action of percolating water, *sinks* exist in this region in many places, though they are by no means as numerous or extensive as in the limestone districts.

Having thus given an account of the nature and arrangement of the strata overlying the shells, as well as those in which they are embedded, we will now describe the general condition and disposition in which the shells occur.

Condition of the shells in the Tertiary Deposites.

In general the state of the shells, and their arrangement in the earth, are such as to indicate their tranquil deposition at the spots in which they are found. Thus the corresponding valves, are very often found together and closely shut. Many of the smaller shells, such as Arca cenetnaria, Arca incile, Nuculæ, Venericardia alticosta, and Chama congregata, which are most usually found thus, are often either entirely empty, or contain a small quantity of clay that is quite impalpable, indicating plainly that they have been exposed to no violence, and that only such solid matter as could pass between the edges of the closed valves had obtained access to the interior. Whenever such shells, however, have been previously drilled, as is very frequently the case, even with the largest and thickest shells, the interior is found enurely filled with sand, clay, green sand, and small fragments of shell. In most cases the larger species of shells, even when their valves appear to be in accurate juxtaposition, is thus filled, and in this case it cannot be supposed that the contained matter has entered through the holes thus drilled, since in many instances shells of considerable magnitude are found imprisoned within. Such shells, no doubt, after the death of the animal, remained open, or at least partially so, and received the sand, clay and other materials which they contain, by the gentle action of the waves. The ligament at the hinge in the mean time would decay, until at length, yielding to the pressure of the accumulating matter above the shell, in favorable circumstances, would collapse into its natural closed condition.

The very common occurrence of the valves in juxtaposition, is a striking proof, that during or subsequent to their deposition, they have not been exposed to violent agencies. This becomes even more remarkable in the case of such shells as the Panopea reflexa, which almost in every instance is found with the valves properly united. The connection between the two valves in this shell is the slightest imaginable, after the destruction of the natural organic bond, and an inconsiderable force would have sufficed to separate and break the valves.

The admirable preservation of the shells in many cases is also an interesting fact, and affords another evidence of the absence of all violent agencies at this period. The most fragile species of Natica, delicate Tellinæ, Mactra Tellinoides, the shell and processes of the Crepidula, the minute and sharp angles of the Fusus Tetricus, the thin and hollow Fissurella are found in perfect preservation in many places. The state of the shells seems to depend chiefly upon the mechanical texture and chemical character of the materials with which they are mixed, and of which the overlying stratum is composed. In the moist blue clay, the shells are generally found in a very soft condition. In a highly ferruginous clayey bed they are found either partially or entirely dissolved, and beautiful casts remain in their stead.

In many places entire banks occur, composed of *casts* of Chama and other shells, sometimes separate, sometimes cemented together so as to form a species of rock. These appearances occur chiefly near the surface, and when the soil is porous and ferruginous. The casts thus formed, often consist chiefly of carbonate of lime, and in many specimens as much as *eighty per cent.* of this substance is found. Casts of this kind belong mostly to the smaller shells, and by far the most common are of the Chama congregata. These, as already stated, are often found nearly or quite

empty, and we may, therefore, conceive, that as the matter of the shell in an extensive bank of Chamas is gradually dissolved, the water charged with carbonate of lime enters the cavities, and slowly deposites the carbonate mixed with fine particles of clay and sand. Thus by degrees the cavities are filled. In the mean time the shell disappears, frequently leaving on the surface of the cast a chalky covering, like the decomposed inner film of shelly matter. In support of this explanation it may be added, that in many casts beautiful crystals of carbonate of lime are found, forming a portion of the cast, and having the appearance of Dog-tooth Spar. In some cases the shelly matter appears to have been dissolved, and its place supplied by the crystallized carbonate, encrusting the earth formerly contained within the shell. Sometimes, too, a thin film of oxide of iron surrounds the cast, showing very distinctly all the markings of the inner surface of the shell. In many localities, presenting a series of beds differing in composition, the shells will be found perfect in some of them, while in others immediately above or below, only casts remain. Thus at the College mill, about one mile from Williamsburg, the upper fossiliferous layer is a yellow silicious sand, containing perfect shells. Below this is a brown ferruginous clay, filled with the most beautiful casts of Chama, Pectunculus, Turritella, &c. The shelly matter has entirely disappeared, and the casts lie loosely in the cavities produced by the removal of the shells, entirely distinct from each other, and covered by a film of oxide of iron. The layer beneath, consisting of bluish green silicious clay, is full of well preserved Pectens, Pernas, and a variety of other shells.

In general, the various species of shells are found associated in colonies or groups, but as in the case of banks of recent shells, these colonies contain many scattered specimens, differing from the general contents of the group. The two species of Chama, the C. congregata and C. corticosa, which are found in almost every deposite of shells in this region, in many cases form extensive beds, with a very small admixture of other genera. The best agricultural marl, of a purely calcareous nature, which is used in lower Virginia, is derived from these beds of Chama, the friable texture of the shell upon exposure to the air, rendering this species of marl more easy of application to land, and more prompt in its ameliorating effects. Crassatellæ often form an extensive deposite, and the large Pectens occur in continuous layers of considerable depth and extent. The different species of Arca, Artemis Crepidula, &c. present a similar arrangement. Even those shells which are of comparatively rare occurrence, are usually found in little groups. Thus the Isocardia fraterna is found, to the extent of a dozen or twenty, closely packed together. This gregarious assemblage of shells of the same species is what would naturally be anticipated in the absence of violent agencies during or after their deposition, and furnishes another very striking proof of the comparatively tranquil condition of the sea or estuary in which they were allowed to accumulate.

Disposition of the fossils.

In nearly all the vertical sections of the deposite we are now describing, a series of beds or strata may be observed, each distinguished by the predominance of one or more species, and the order of superposition of these beds frequently continues without interruption for some distance. It does not appear, however, that in localities remote from each other, the arrangement of the shells is always alike, although in many instances there appears to be a striking correspondence. In a majority of cases in the neighborhood of Williamsburg, the upper layer is composed principally of Chama congregata. In many localities also, the large Pectens mingled with Ostrea Virginica occupy the highest place. But generally, the same shell reappears as a predominant constituent of one or more of the subjacent beds; and such is the diversity of arrangement, even in the places but a few miles distant, that it is obvious that no general order of the succession exists. Thus, in a range of three miles we find Perna maxillata in some localities in the lowest stratum of dark blue argillaceous sand; in others, forming an upper, or even the highest layer of the series. At Waller's mill, three miles from Williamsburg, this fossil overlies the other shells; whereas at the College mill, as already stated, it forms a part of the lowest visible stratum.

With the view of conveying more precise ideas of the disposition of the fossils in this region, we annex the following details in relation to some of the more important localities, which have been minutely examined.

King's mill, one of the most interesting fossil localities in the neighborhood of Williamsburg, is situated on the north bank of James river, about twenty-five miles from its mouth. The cliff in which the shells appear is abrupt, and has a height varying from twenty to forty-five feet above the water. The strata of shells extend along the river with slight interruptions, when the cliff sinks nearly to the level of the water, for a distance of between two and three miles, and they are found in a somewhat similar order of superposition for some distance inland. Their general direction is horizontal, but the outline of any one stratum is frequently very irregular, the surface rising and falling with a steep inclination. This irregular outline is particularly remarkable with the beds of Chama, which are very thick at some points, and then fine out rapidly and again expand.

This deposite of shell is covered to the depth of from four to six feet by a brownish yellow sand, intermixed with stripes of clay. Beneath this a thin layer of about one foot, of very argillaceous and ferruginous clay of a red color. This rests upon a few inches thickness of gravel, consisting of water-worn quartz, rarely larger than a pea. Beneath this is a layer, from one to two feet thick, consisting of yellow sand, containing a great deal of the green or chloritic sand, arranged in narrow stripes. Next follows a layer of the same sand, containing principally Chama and Venus deformis. This is from two or three feet in thickness. Immediately below is a stratum consisting almost exclusively of Chama, with a few Arca centenaria, &c. This stratum, varying from three to four feet in thickness, is a mass of compacted shells, with but little earthy matter intervening. The earthy matter contains a very large proportion of the chloritic sand. The next stratum is composed chiefly of large Pectens, and has a thickness of

from one to two feet. Below this is another dense stratum of Chama, together with Arca centenaria, Panopea reflexa, &c. and also very rich in the green sand. Thickness, from four to six feet. Then follows a second layer containing Pectens with Ostrea compressirostra, one foot in thickness. A third stratum in which Chama predominates, follows next, in thickness from two or three feet, and at the base of the cliff is a layer containing Pectens, Ostrea compressirostra, &c. from four to five feet in thickness.

Thus through a height of more than twenty feet in some places, the cliff consists principally of shells, of which there are a great many species besides those mentioned as predominating in the several beds. On the extensive contiguous estates of King's mill and Littletown, these shells are largely used as a manure: and for this purpose the first and seconds beds of Chama are preferred on account of the immense amount of calcareous matter, and the large proportion of green sand which they contain. Judging from the occasional appearance of bluish green clay on the line of the beach, and in some places immediately at the base of the cliff just described, it is highly probable that a continuous stratum of this substance lies beneath the other beds throughout the whole extent observed. A horizontal bed of yellowish clay extends for some distance along a lower portion of the cliff, in which there are no fossils; running within a few feet of its upper edge, and beneath this bed, and parallel to it, is a thin layer of the iron ore formerly described. At the foot of this cliff appears the underlying stratum of clay.

Description of the cliffs at Yorktown on York River.

The elevation, abrupt form, and peculiar structure of the cliffs at this point, and for some distance, both above and below, render it an interesting spot to the geologist. A dry and ample beach, uninterrupted by creeks or inlets for several miles, affords a ready access to the banks, while the river's edge, strewed with fossils which have fallen from the cliff, exposes a considerable variety of interesting specimens. Immediately at York, the river is only three eighths of a mile in width, but both above and below it expands to a breadth six or seven times as great.

At Wormley's creek, about two miles below the town, the cliff about to be described begins; but from this point, down to the extremity of the peninsula, the banks are uniformly flat and low. The cliff here consists at bottom of a bluish sandy clay, containing immense numbers of Turritella alticosta, Cytherea sayana, and many small Univalves, over which lies a layer of brownish yellow sand, with very few shells, and those chiefly Nucula limatula, and a few other species. To this succeeds a stratum composed almost entirely of Crepidula costata, so closely packed together, as to leave little space for sand or other earthy matter. The whole is covered to a variable depth by a stratum of coarse sand of various strong tints, and evidently highly ferruginous. The elevation of the cliff increases, and the nature of its contents gradually changes in approaching York. The lower stratum disappears entirely after continuing for something less than half a mile, previous to which, however, its fossil contents are changed; the layer of the Turritellæ being replaced by Crepidula closely packed together. Crepidula stills runs on horizontally above, and the intermediate stratum is now densely filled with Pectens, Venus deformis, Ostrea, and a great variety of small shells frequently connected together, so as to form hard masses of considerable size. Still higher up the river the deposite assumes the character of successive layers composed of comminuted shells, connected together so as to form a porous rock. These fragments are generally so much rubbed and water-worn, as to render it impossible to ascertain the species of shells of which they once were portions. Many small shells, and occasionally large ones, particularly Pectens, are found mingled with the other constituents of the rocks; and in some places thin layers of shells, such as Venus and Crepidula, intervene between the adjacent strata. The height of this fragmentary rock amounts in some places to forty feet. In most places it has a highly ferruginous aspect, though this is not invariably the case. Frequently shells of considerable size, such as Lucina, anodonta, are seen coated with, or entirely changed into crystalline carbonate of lime, firmly cemented in the mass. The texture of the rock is various, at some points admitting of being readily excavated by the pick and spade, so as to form caves which have been occasionally used by the inhabitants; in other places exhibiting a hard and semi-crystalline structure, and having the compactness of some forms of secondary limestone. The lower portion of the cliff, having less cohesion than the rest, has been scooped out by the action of water, so as to give it occasionally an impending attitude.

Above the town, the stratum of fragmentary rock becomes much thinner, being now reduced to about ten or twelve feet. A stratum of yellowish argillaceous clay, abounding in Artemis acetabulum, Mactras, and other large shells, lies immediately beneath the rock; and lower still, appears the stratum of bluish clay, filled with Nucula Limatula, several species of Fusus, and various other fossils.

A narrow layer of *iron ore* extends along the cliff, with occasional interruptions, at a small distance above the fossiliferous strata.

This fragmentary rock continues in a narrow band, with some interruptions, for about a mile and a half above York. Beyond this point it is met with chiefly in detached masses. Extensive beds of shells, similar to those which appear at York, come to view in the vicinity of Bellefield, and line the shore for a distance of about three miles. These beds rest on the usual stratum of sandy clay, and are in some places, as already described, covered by a stratum of the same substance. At a still remoter point, about six miles above York, on Jones's plantation, a porous rocky mass occurs, overlying the stratum of shells in a thin and interrupted layer. Though very similar in appearance to the fragmentary mass before described, and evidently at one time composed of portions of shells, it is almost devoid of any trace of carbonate of lime. It appears to consist of silex, slighty tinged with oxide of iron; approaching in its porous character and harsh gritty texture, to the nature of the burr stone of France. Associated with this, is a more compact rock, containing some carbonate of lime, much silex, and exhibiting very perfect casts and impressions of Pectens,

Cardium, &c. Over these strata is the usual layer of ironstone, and the general aspect of the upper beds is somewhat ferruginous.

It is interesting to remark, that with some interruptions, a fragmentary deposite, similar to that observed at York, extends to the low extremity of the peninsula. At Pocosin, a flat swampy country, which is often inundated by the tides, this deposite is uniformly met with by digging a few feet below the surface Pectunculus, Pecten, Ostrea, as well as numerous small shells occur mingled with it, as at York; the fragments, however, are not cemented together, but form a loose friable mass. A rock, consisting of cemented fragments of shells, occurs also at various other points on the eastern portion of the Miocene district; and a fragmentary deposite, like that above described, is found near the extremity of all the peninsulas formed by our great rivers.

A very interesting feature in the structure of the cliff at York remains to be described. Though the general direction of the fossil beds is nearly horizontal, several of the strata of rock are composed of transverse layers parallel to each other, generally dipping towards the north, and making an angle of fifien or twenty degrees with the horizon. The course of these laminæ sometimes differs in adjoining strata, and in some places the obliquity diminishes gradually until the laminæ become horizontal; thus presenting a remarkable resemblance to the appearances described by Lyell and others, as existing in the Crag of England. The phenomenon here described, viewed in connexion with the fragmentary structure of the rock, and the general distribution of broken shells over the lower extremity of the peninsula, would seem to indicate the former agency in this district of coast currents and an ocean surf. The beds of shelly matter comminuted by these means, and subsequently elevated above the level of the tide, would be gradually cemented into a rocky mass by the crystallization between the particles of such portions of the calcareous matter, as the rain when just fallen was capable of dissolving. The solvent power of rain, being chiefly due to a portion of carbonic acid with which it becomes united in its descent through the air, would be lost, as the liquid percolated through the shelly strata, and thus the calcareous matter which it had seized, would be gradually deposited in the crystalline form.

Besides shells and Zoophytes, the bones of cetaceous animals and the teeth of sharks, are of very frequent occurrence in the fossiliferous beds, but no remains of *fresh water or land animals* have as yet been discovered. The total number of species of shells from these points which have yet been identified, is about ninety-six, to which may now be added several new species recently discovered, and described in a joint paper by Professor H. D. Rogers and myself.

The structure of the interesting portion of the state lying on the eastern side of the Chesapeake, is so far, as hitherto explored, extremely simple; but as yet only the surface strata have been examined, and it is far from being improbable, that at no very considerable depth beyond that reached by the ordinary wells of the country, deposites calculated to prove of much economical value, might be attained. Beneath the superficial sands and sandy clays of the country, a bed of clay of a tenacious character is first reached, frequently impregnated with salt, and communicating to the water obtained from it more or less of a brackish flavor. Beneath this a more arenacious bed occurs, beyond which, as far as I can learn, no digging has been carried. From this more sandy stratum, water of a purer quality is procured. Hitherto no beds of marl or fossil shells have been found any where in this region. Yet there is reason for the opinion, that such deposites would be met with by boring to some depth, and possibly near enough to the surface to prove available in the agriculture of the country.

The water of the Miocene marl district, whether of wells or springs, presents nearly as great variety as the mineral beds from which it issues. In the more eastern parts of the region, it generally contains a notable impregnation of common salt, and in neighborhoods where shell marl abounds, a marked proportion of calcareous matter. The copiousness and transparency of springs of the latter description, as well as the carbonate of lime which they hold dissolved, give them a character nearly allied to that of the *limestone springs* of other regions, while the common salt which they almost invariably contain, and with which they are sometimes strongly imbued, constitutes an important feature of distinction. The beds of ferruginous clay and sand in many cases, impress a a slight chalybeate character upon the water, and occasionally impart to it so large an impregnation of iron as to render it of decidedly medicinal utility.

Owing to the calcareous matter, and occasionally other substances which it holds in solution, nearly all the water of this region possesses the character of hardness. By boiling, this evil is entirely remedied;—the carbonate of lime is precipitated, first rendering the liquid cloudy, and subsequently collecting on the sides and bottom of the vessel in the form of a thin incrustation. In such of the arts as require a water free from this peculiarity, the marl water should be boiled previous to use; or, in lieu of this, though by no means an effectual substitute, it should be exposed for some time to the sun in open reservoirs. The carbonic acid which is the chief solvent of the calcareous matter, being expelled by heat, suffers the latter to separate from the liquid, and thus the cause of the hardness of the water is in a great degree removed. It is obvious from these facts, that the water obtained from strata of gravel, sand or pure clay, will in general be purest and most suitable for employment in the arts. As an example of the kind of impregnation usual in the water of this district, I subjoin the results of an analysis of the contents of a spring in James City county, near Williamsburg. In 400 cubic inches of this water, the aggregate of solid matter was found to be 104.49 grs. consisting of the following substances, viz:

Muriate of soda,	49.84
Muriate of lime,	15.08
Carbonate of lime,	26.73
Sulphate of lime,	6.24
Silica and alumina,	4.00
Sulphate of soda,	0.25
Ammonia, a trace,	
Organic matter,	1.00
Loss,	1.75
	104.49

The large proportion of Muriatic soda shown to be present in the above instance, is an interesting fact particularly when taken in connection with the locality whence the water was procured. For, it cannot be considered probable that this ingredient could be derived from the neighboring river or the bay, as this would imply an extent of filtration in an horizontal and upward direction, which it would be unphilosophical to admit. It is rather, as I conceive, to be looked upon as referrible to the former impregnation of saline matter derived from the waters of the ocean, beneath which nearly all the strata of this region were originally deposited.

Nature and varieties of the Miocene Shell Marl.

In the general description of the district of which we are now treating, a detailed account has been given of the arrangement of the beds of fossils as they occur in nearly all the localities which have been examined, accompanied by an enumeration of the principle shells, an account of the materials in which they are embedded, and with which they are associated in contiguous strata. We are next to consider the materials of these beds in relation to their agricultural importance, and to exhibit the relative value of the marl of different localities as illustrated by chemical examination. A large proportion of the matter of all shells consists of *carbonate of l me*. Hence they are nearly identical in composition with limestone, chalk and marble. To this ingredient, in whatever form it may be applied to the soil, general experience has ascribed a very high degree of fertilizing power, and hence, in the application of all the varieties of calcareous marl, we are guided chiefly by the proportion of the carbonate which they contain, as determined by chemical analysis. It should not, however, be inferred, that the various mixtures of earths and other substances with which the calcareous matter is usually associated, are devoid of useful action when applied to land. The experience of agriculturists is certainly inconsistent with such an opinion, though it has most clearly evinced the powerful efficacy of calcareous manures. The invaluable publications of the editor of the Farmers' Register by directing the attention of farmers to the employment of the shell marl with which nature has supplied them in such rich abundance, have led so extensively to the application of this manure, and have produced so general a conviction of its fertilizing effects as to render it unnecessary in this place to introduce either facts or arguments in its favor. To the valuable practical suggestions of this gentleman, contained in the "Calcareous Manures" and other publications, we are indebted for much of the amelioration which has taken place in the agriculture of eastern Virginia, and I therefore cannot do better, in alluding to this branch of my subject, than to recommend these works to the earnest perusal of all who are interested in advancing the prosperity of that portion of the state.

But although the richness of the marl is mainly dependent on the *proportion* of its calcareous contents, it is also largely influenced by the nature and condition of the shells of which it is composed. It is well known that the recent oyster shell, especially in its unbroken state, is far less immediate and powerful in its action upon land than the friable and pulverulent shells, of which many of the most valuable marl beds are principally made up. Yet in the composition of the recent oyster shell, the amount of calcareous ingredient is nearly as great as in the richest marl beds which we have examined. According to an analysis which I made some years ago, 100 grains of this material were found to contain

Carbonate of lime,	95.18 grs.
Phosphate of lime,	1.88
Silex (probably accidental,)	0.40
Water,	1.62
Insoluble animal matter,	0.45
Loss, &c.	0.45
	100.00

[*Vide Farm. Reg., Vol.* 1. *and Silliman's Jour.*

These remarks being also applicable to some species of fossil shells, it becomes necessary to a judicious selection of the marl, to give some attention to the different nature of the shells contained in the several varieties of marls offered to our choice.

Kinds of shells which are least likely to be useful.

The fossil oyster and scallop shells, (Ostrea Virginica and Pecten,) of which many marl beds are almost exclusively composed, are generally found in a nearly unaltered state. Comparing the composition of these shells, as ascertained by my analysis, with that of the recent shells, the animal which, though small in quantity, seems to act powerfully as a cement for the other materials, was found to have been retained in almost undiminished proportion; and thus these shells are scarcely better fitted for the soil, than recent ones of the same species. It is to the animal matter retained by the fossil scallops that we are to ascribe the dark color which they assume when burnt for lime. Whatever might be the usefulness of this ingredient if mingled with the soil, it here operates to impair the value of the shell as calcareous manure by the insoluble character it imparts to the materials it holds together. Next in tardiness of disintegration, and in consequent inefficiency as a manure, may be enumerated the large clam, (Venus mercenaria,) and an oblong smooth flat shell, (Crassatella.) These, however, have evidently undergone a change, which prepares them for yielding, more readily than the former, to the agencies of the seasons. Most of the other species, though entire when first found, soon fall to pieces and spread their fertilizing fragments through the soil. There is, however, even among them some room for choice—and this leads us to consider the

Kinds of shells which are most suited for the purpose of marling.

The Chama, formerly mentioned as occurring in extensive beds in some portions of the Miocene, and existing in considerable proportion in nearly all the fossil strata, forms the principal component of some of the most productive marls. This is a small two-valved shell of rugged exterior, which readily breaks to pieces in the ground, and is

spread evenly over the land with great facility. Another shell, (Surpula) of which there are numerous rich beds in Surry county, possesses these advantages in a still higher degree. From its fragile texture, and irregular tubular structure, it is quickly mingled with the soil in a minutely subdivided state, and as like the Chama, it frequently occupies the marl beds to the exclusion of other fossils, it furnishes a marl of a very superior description. As a general rule, the small shells are most likely to prove efficacious, as well from the fact that, where they occur, the proportion of carbonate of lime and green sand is usually great, as because they are most easily reduced to the condition in which they become available in the land.

Of the Pulverulent white marl.—In many situations the marl presents an appearance not very unlike that of an impure chalk. The mass of the stratum is chiefly made up of a white or yellowish friable material, intermixed with fragments of the harder species of shells. In such cases the shells are rarely found entire, and the condition of the fragments is usually such as to render it difficult to recognize the species of fossil to which they belonged. Many extensive beds of marl of this description have been opened in the counties of Middlesex, New Kent, James City, York and Gloucester, all of them largely abounding in calcareous matter. Even as much as 97 per cent. of this substance was found in a specimen from one of these localities; and it will appear from the table of calcareous marls hereafter to be given, that in general the proportion exceeds 80 in the 100. Occasionally, however, a mixture occurs in which the calcareous matter is blended with a large proportion of white clay and sand, presenting in the mass an aspect so nearly resembling the former, that without chemical analysis it would be difficult to distinguish between them.

Of the blue marl.—In our general description of the arrangement of the fossiliferous strata, mention has been made of the bluish green or clayey marl which occurs low down in the ravines and near the water's edge on the river banks. This is what is usually known amongst farmers as the blue marl. From the soft condition of the shelly matter which it contains, and the predominance of clay in its composition, this has been found peculiarly serviceable when applied to the more arenacious varieties of soil. In the quantity of calcareous matter which it contains, it is usually inferior to the beds of a white or brown color, which in many places rest above it, though it is not to be inferred that in many instances it may not prove equally advantageous to the land. The coloring matter of the clay appears in part to consist of a carbonaceous matter, derived probably from the organic materials originally associated with the shells, and often in part of a minutely divided green sand, either of which ingredients might be expected to aid the calcareous and clayey matter in benefitting the soil.

Of the hard Ferruginous marls.—In some localities the beds consist of shells more or less broken, intermixed with a brown ferruginous sandy clay, and often cemented with these materials into masses which are broken with some difficulty. These, although rich in calcareous matter, must obviously from their mechanical texture, prove less valuable than either of the former. To this class also, may be referred the shell rock, and fragmentary masses approaching to limestone, which occur in various places.

From the large per centage of carbonate of lime which these contain, there can be no doubt that by burning, they might be converted into a highly valuable lime. A specimen from the cliff at York, yielded 87 per cent. of calcareous carbonate, as large a proportion as most of the valley limestone have been found to contain: computing the quantity of caustic lime, corresponding to this, we find that 100 pounds of the shell rock would yield 48.7 pounds of strong lime. It is, therefore, well worthy of consideration, whether the conversion of this material into lime, might not be an object of profitable enterprise. In the neighborhood of York, and other places, where it occurs, rock of sufficient hardness might be obtained in great abundance, and at comparatively little cost; and the cheapness of fuel would render the operation of burning, one of moderate expense. That much of this rock, when exposed to intense heat, would fall to pieces, and thus injure the value of the product for distant use, is undoubtedly true. But there is also much of it found in bends throughout the cliff, which has almost as great solidity and permanency in the fire, as a secondary limestone, and from this, a lime of superior character might unquestionably be produced. Owing to the great abundance of shell marl in these places, and the general resemblance of this material to the constituents of a marl bank, its probable utility in this point of view, appears hitherto to have been overlooked. But regarding it in its true light, as a *tertiary limestone*, we see no reason why it should not become a source of profitable manufacture in its immediate vicinity.

For the Farmers' Register.

EXPERIMENTS ON GATHERING CORN EARLY, AND DRYING IT IN VENTILATED PENS.

[Subject continued from page 52, Vol. I.]

It is an old remark, of which the truth and value are often admitted, but which is seldom acted on, that the fair and correct reports of experiments which have resulted in loss, and the exposure of the mistaken and false opinions which induced such experiments, would be often as valuable, as any communications of successful practices. But still, the *soreness* caused by the disappointment of sanguine expectations, and the shame felt in confessing that we had formerly entertained very erroneous opinions, and, perhaps had pursued some very foolish practice, serve generally to close our lips as to the experiments which produced disappointment and loss. In consequence of such silence being preserved, the same practices may be repeatedly tried by different persons, each ignorant of what others had previously learned, and thus each in his turn encountering the same risks, and sustaining similar losses. These considerations ought to be enough to induce me to make known the disasters and losses which in some years have attended a practice, which in other years has been highly successful and advantageous. And in addition, it is my duty to state that there is much hazard, at least, in adopting a practice, which I have formerly recommended in this journal, as safe (with proper precautions) and profitable.

The statements respecting the experiments of 1833, were written as they will be given below (from memoranda made at the time of the several occurrences,) and were designed for publication in the following winter. A desire to make the proofs of success and profit complete, by another season's trial on a larger scale, induced me to wait for the securing of the next crop. Of that, a daily journal of proceedings was also kept, from which the following statement is now prepared. These results were as disastrous, as the previous ones had been flattering or successful. The marked difference of seasons and of results left the question still doubtful, and made it proper to wait for a further trial, which was made in the last crop. Readers will judge for themselves whether greater care, and more judgement, than I was able to have exercised, may not enable them to obtain the benefits of this practice, in suitable seasons, without the risk of loss under different circumstances. The details presented will at least show the different causes of both the safety and danger—and may also throw light on the principles of drying and preserving corn, which may be of use in all other modes of securing the harvest.

The reader will notice throughout the statement of the experiments of 1833, that my confidence in the safety of the plan was unbounded—and so it remained until several hundred barrels of the next year's crop had been gathered. The expressions which grew out of that confidence, however mistaken, as well as all other statements, I have left unchanged.

Experiments of 1833.

In No. 1. Vol. I. of the Farmers' Register, three experiments were reported on the gathering of corn at times much earlier than usual. On part of my crops of 1833, (on two farms in Prince George county, Va.) this practice was continued; and though several errors were again committed, the results have been such as to leave no doubt as to the safety and propriety of the plan. These additional facts will now be presented. As the manner of constructing the pens was minutely described before, (page 50, Vol. I.) it will be unnecessary to repeat the general plan here, though some variations will be mentioned.

The corn crop of 1833 in lower Virginia was matured uncommonly early; and was as dry by the 15th of September, as it was in 1832, on similar soils, by the 30th. A long continuance of rainy weather which lasted through nearly all May, and part of June, had prevented the usual and proper tillage, and had endangered the crop by the growth of grass. The latter part of the growing season had been very dry, and no rain had fallen for several weeks before the commencement of the gathering. About the 11th of September it was unusually cold—the 18th, 19th and 20th, unusually hot for the season. On the last two of these days, my thermometer in the shade, and in open air, rose to 92° and 92½°.

Experiment 4.—Began to gather corn, on September 18th. The tops had been cut about 10 days before, and the blade fodder stripped perhaps 15 days earlier. The land on which the corn grew was generally a clay loam—a smaller part, sandy loam—and the average product about 25 bushels of grain to the acre. Only the ears on which the shucks continued green, (and these were but few) were separated, as not ripe enough for the general treatment.

The first pen was filled with ears, and covered in, by the morning of the 21st. It was 9½ feet square, inside measure, 12 feet high, and with only one flue, (intended for 4 inches wide) carried up through the middle. Before the cover or roof of corn-stalks was completed, a slow rain began to fall.

The first planting of this field had been of the large soft corn, and a large proportion of it, of the red kind. The replanting was generally of the small flinty, or rare-ripe corn, to insure greater equality in ripening. But as the crop had not stood well, *setting* of plants was resorted to, and to this cause I attribute the circumstance that a small portion of the corn of the large kind, was still very green—the hearts of the grains milky, and the cobs so green and sappy that water might have been pressed out of them. Of course, these green ears (with the exceptions that will be named) were not permitted to be penned with the large dryer body.

A material objection to this pen was discovered before it was half finished, but too late to avoid it. Old oak fence-rails, which were neither straight nor strong, were used in part to build the pen; and these not being enough, green pine rails were mauled, as the pen was filling, and used for the balance. The rails were not notched so as to lie close, except near the bottom (to guard against the depredations of fowls,) and the ears were kept from falling through the openings, caused by the irregular form of the old rails and the flexibility of the green ones, by being placed perpendicularly and close together along the most open places. To do this, required a man to be closely engaged in placing the ears, while others were pouring in the baskets of corn—and his continued trampling settled the ears much closer than they would otherwise have been. Besides this, the flue (as formerly) had been kept open by two perpendicular rails being placed within the two ends, so as to keep the sides of the flue from being pressed in by the corn, during the filling. But the green rails so yielded to the pressure, as in some places to close the flue in the middle, and to diminish its average width throughout. The remedy for all these evils, would have been to use seasoned rails, as straight and as strong as pine rails are generally.

The corn in this pen was not moved until January 17th. The winter so far had been very wet, and some fear was entertained that the heavy rains had penetrated the roof of corn-stalks. It did not appear however that a drop had gotten through. The most exposed ears of corn, next the openings between the side rails, and sometimes extending partly outside, were somewhat discolored by the long exposure to rain, and every change of weather—but not rotted, nor materially hurt in any way. The ears partially rotted found in the whole pen, perhaps might have amounted to from one to two bushels. These were principally of the red corn, which was observed, at the time of penning, to have much more of rotten than the white. The whole loss in rotten corn was inconsiderable, and even that did not seem to be attributable to the greenness of the corn. Many ears evidently among the greenest in the pen, (and one of these had been selected, and distinguished by a mark when building the pen,) were observed to be perfectly sound. The closeness of the bulk, owing to

the causes above stated, it is probable, was prejudicial, and may have caused, or increased this slight amount of loss.

The very green ears (mostly also small,) which had not been put in the general mass, were mostly put together in a partition only 15 inches wide, in another pen. From their small size, they lay very close together, and many of the greenest were found (Oct. 18th) to be damaged. Blue mould was between the grains, which had evidently proceeded from the cob, but which had not (apparently) affected the inside of the grain. The mould was then completely dry, and of course the progress of injury was at an end. The proper way to prevent any loss in the small portion of such very green corn, is to feed it away to hogs as soon as possible. It is in the best state for that use, and then there would not be an ear lost. It may also be cured sound, (though shrivelled from want of maturing,) by being left in the shuck, and laid to dry singly over an open platform, or floor.

Experiment 5.—On another farm two pens were erected on the barn floor, and the filling of both was commenced on Sept. 24th. The land here was a sandy loam, about equal to the other in productiveness. The whole crop, (including the replanted,) was of the common large white corn. In one of the pens, two flues were made, so as to divide the corn into three separate partitions, and in the other (as in the previous cases) only one flue. All these flues were made a foot wide at bottom, and for a few rails in height—and then were drawn in to the usual width of 4 inches. As there was no danger (in a house) of loss from depredations, nor of exposure to the weather, no care was used to keep the side rails close; and of course no cover was wanting. The pens were raised to the joists (about 12 feet.) After having been filled a few feet, the broad ends of the flue (about a foot deep) were cut out with a saw, so as to make room to introduce a hoe when necessary to draw out such ears as fell through the sides, and might otherwise have choaked the flue. By using this means, no care was wanting to place the ears in the pens, to effect which before, had been both troublesome, and hurtful. The trouble of making and filling pens within doors, was found to be altogether much the easiest job, and was equally effectual. There were no green shucks when this gathering was commenced, nor was there any corn excluded from the pen, except such as was already rotten. The short and greenest ears were put into one of the narrow partitions, and soon after fed to the fattening hogs, without any loss, or the appearance of damage commencing. The remainder of the corn in that pen, was used on the farm by the last of November, without finding more than a dozen ears showing any appearance of mouldiness. The other (with only one flue) was emptied, and the corn beaten out for sale, Jan. 14th and 15th, and every ear that was the least damaged, was separated for my inspection. They were only about 25 in number. The corn was then in good order for shipping, and unusually dry for the time of year. These two pens held about 100, or 110 barrels of corn, and the one mentioned in Experiment 4, about 60 or 65.

The whole amount of mouldy and rotten corn in the three large pens would certainly not have been equal to one bushel of grain to 1000 of the sound. Still it is a matter of some importance to know whether even this small loss was caused by the early gathering: for if it causes *any* to rot, the plan is so far objectionable, and may be dangerous. I fully believe that not a single ear will be lost, or injured, by the proper use of this plan, and that the small loss which I sustained, was owing to other circumstances. This is not susceptible of being proved; but I will state the several reasons for the opinion.

It is customary on every farm, when corn is gathered and housed at the usual late time, to assort the crop into three parcels, long, short, and damaged or rotten. The first parcel includes only the best and perfectly sound ears, and is intended for bread for the family, or for sale. Yet I have never seen a crib of long corn emptied in the spring, without finding rotten ears, and more than could be supposed to have escaped the notice of the laborers when filling the house. I infer that many of these ears, as well as of those found rotten in my pens, though appearing fair outside, when gathered, had some early internal defect, and would have rotted in any mode of housing. Rotten ears of large size and perfect form, and securely covered by the shuck, are often gathered from the stalk, without there being any apparent cause for such an effect; and what is well known to take place thus early, may be reasonably supposed to be sometimes produced, or to reach its completion, after gathering the crop.

If gathering when in a green state alone would cause mouldiness or rotting, the greenest of the ears, however kept after gathering, ought to be so affected. But some of the greenest, selected and marked, have been kept perfectly sound—some singly, some at the outer sides of the pens, and one in the interior. But many sound ears have been found (in Experiment 4th,) pressed out of shape by the weight of the mass, and therefore evidently were such as were soft and full of sap when put up. All such are more or less shrivelled—but that was caused by the fodder and tops being removed, (which kills the plant,) and not by the ears being gathered afterwards. I readily agree that great damage is often done to corn by too soon stripping it of its leaves. In many cases, the damage to the whole crop of grain is not short of the whole *net* profit of the crop of fodder. But this evil, great as it is, has nothing to do with the propriety of early gathering the corn.

On September 20th, a very large and well formed ear of corn, was gathered. The shuck was still green, and therefore the ear was excluded from the pen. When shucked, the grains seemed firm, and as much sunk at the ends as they were expected to become. The cob however, was so green, that sap could be pressed from the end of the pith, by a slight pressure with the thumb nail. In that state, the ear, divested of the shuck, weighed 1 lb. 14½ oz. It was placed in a dry and warm room, and when weighed again, about Christmas, had lost 13 oz. Still, the grains were as firm and as compactly set on the ear as ever, and perfectly sound. The principal loss of weight was from the cob; and by its shrinking in size, the grains were kept as close together as at first. This ear was barely below my standard of fitness for the pen, and many no doubt were included (by carelessness,) still greener. The great proportion of water which it lost in drying, and its perfect state afterwards, show that good ventilation only would

have been wasting to it, if in the pen. And further—when the grains are found shrivelled, and standing loosely on the cob, it is evident that the fodder was gathered, and the plant killed, when the grain was still greener than this ear had been when the stalk on which it grew was topped.

I shall entertain no more doubts as to the safety of early gathering corn; and the saving of labor in the whole business of harvesting corn and sowing wheat, thereby made, is a very important matter. A still greater saving of labor (and perhaps of manure,) may be derived from this plan, by ploughing in the green corn-stalks, in preparing for wheat, as soon as the ears have been removed. This will save all the collecting and carting of stalks to the farm-yard, and bringing them back again to the land, and will enable us to be ploughing for wheat fifteen or twenty days sooner than it is prudent to begin to sow, or advisable to cut up and shock the corn in the usual manner.

The precautions which will make the practice perfectly safe and advantageous, are these:

1. Replant (and set, if setting should be required,) with an earlier kind of grain than the first and main planting, so as to have the ripening of all the grain as nearly equal as possible.

2. Begin to gather the corn as soon as nearly all the shucks have lost their green color, and put none with green shucks into the pens.

3. Build the pens in a house, in preference, if convenient: if out of doors, use straight and seasoned rails, not too large. In either case, let there be at least six inches between the rail floor of the pen and the earth, (or the plank floor of the house,) the flue four inches throughout, and a clear passage for air on every side of the pen.

4. The small proportion of soft and greenest corn should be kept thin, and in the shuck, and fed away rapidly.

It is the internal moisture (of the cob) only that endangers ears of corn. No other grain can be kept so easily, or may be exposed to the like rough treatment. We know that dry ears of corn (at the usual time of shucking) are not hurt by rain, and may be put up wet in our open log cribs, and left there, without fear, in bulk, to dry. By carelessness, some of my early gathered corn of the last crop, was exposed to the worst of such treatment, and without injury. A large bulk of corn had been shucked, for penning, and was completely drenched by the heavy rain which fell on the 30th of September and 1st of October. As soon as the rain ceased, the corn, without drying at all, was carried into the upper story of the barn, and laid about two feet thick on a platform of fence-rails raised a few inches from the plank floor. The windows were left open for a few days. This parcel was beaten out for sale a few days ago, and was perfectly dry and sound.

January 25th, 1834.

Experiments of 1834.

Before commencing the statements of experiments of the next year, it is proper to mention several circumstances which led to the loss that ensued. The latter part of the growing season had been attended by a long and severe drought, which parched the leaves of the corn and dried the shucks, so as to produce an appearance of greater maturity than the grain really possessed. Hence, much corn, of which the shuck had partly lost its green color, (my previous test of its being fit to gather,) was actually too green. Next, there prevailed through all the early (and of course the most hazardous) time of gathering, a remarkable, and indeed unexampled succession of rains—and of damp and warm weather generally, when not raining. A third disadvantage was, (and which was alone a sufficient cause of failure,) that the business was carried on by my general orders, but not under my immediate superintendence, nor on the farm where I resided. Hence arose much of the gross carelessness and mismanagement displayed afterwards, but which was not so apparent at first.

1834. *September 16th.* Began to gather corn, and to haul it in to the barn door for shucking. Corn the large white kind—the land light, warm, and rich. The cutting up and securing the stalks, and ploughing the land (for wheat) was to follow immediately after—and it was *designed* that the gathering should be carried on no faster, than would give room for these operations, and permit the shucking and penning of the corn to proceed as fast as the labor could be given. Contrary to this, about sixty-five barrels the first day, was pulled off, and all except the few loads hauled in, left lying on the ground. The carting in of this was not finished until the 19th. Cloudy before night.

17th. Raining more than half the day—generally slowly, but sometimes quite fast. The hands being engaged in securing blade fodder (gathered and curing previously,) until the increase of rain stopped that work, no corn was shucked until evening. Part of the heap was thrown into the barn for that purpose, but not until it had been exposed to the rain for several hours. Began the first pen, in the barn—on a floor of fence-rails—the pen nine feet square, inside measure, and divided as formerly into two parts, by a central flue of four inches between the rails which formed it. The separate bulks of corn were nine feet long, and four wide, the construction of the flue taking up about twelve inches width.

18th. Very damp air, and the corn also damp to an alarming degree. Light drizzle, with driving south wind: increase of rain in the evening. The shucking and penning proceeding.

19th. Cloudy, and more rain threatening, for some hours of the morning—but sunshine before noon, and heat oppressive.

20th. A few more loads of corn pulled and hauled in. Three pens partly filled, as high as five or six feet each, making about seventy-five barrels of corn.

21st. Sunday. Cloudy, and frequent showers throughout the day.

22d. The overseer reported that a warm steam from the corn was noticed early in the morning—but as it was not perceptible to me at 9 o'clock, I supposed that it was merely the effect of the drying of the corn, and made evident by the difference of the internal and external temperature of the air. Cloudy.—Gathering corn again, and began a fourth pen—avoiding as yet to fill any more than six feet deep. At night, and until next morning after day-break, a steady rain, of which a large quantity fell. Nearly all the corn gathered

the day before, in a heap outside of the barn door (not shucked) and exposed to all the rain.

23d. In the morning, so damp a steam was rising from the pen No. 3, (began the 18th, and filled only six feet,) that the overseer was alarmed, and was induced to open a hole for examination, by taking out ears from the top—and in this manner, as he reported, he penetrated *below* the dampest corn. I saw that some of the ears taken out for this examination, were evidently so green and soft that they ought never to have been put up in that manner—and these were slightly damaged, and generally where the grains were bruised or wounded by rough and careless handling after being shucked. On other ears had been formed a white mould generally—and the worst of these were two ears that had been lying on the top of the bulk, and had not been covered or moved. These several facts seemed to indicate that, it was the extreme dampness of the weather, and not the position of the corn in the pens, that had caused the damage—and that whatever had been the cause of the injury, it had then ceased to operate. This pen was on the second story of the house, on an open floor of fence-rails laid across the joists, and consequently was as well ventilated as possible. Penned no more corn, for the present, and began this morning to lay the parcel which was last shucked, in the garret of the barn, about two and a half feet deep, on an open floor of rails. About twenty barrels more brought in before night.

24th. Rain began in the night to fall lightly—and continued all this day without cessation, and part of the time heavily, and had not quite ceased at 9 o'clock, P. M. The corn brought in the day before, was thrown into the house soon after day break, before much rain had fallen, and shucked and put up in the garret. This was the only portion of all yet gathered, which had not been in a soaking rain, or in repeated showers, either lying on the ground in the field, or at the barn door before being shucked.

25th. Cloudy and damp until near 10 A. M. Carting in corn again. Shucks of course quite wet. Still putting the corn in the garret. The steam from the third pen still continued, as the corn was damp at and near the top, though dryer, and apparently safe, 18 inches below. Some of the ears which were evidently too green, had fine white mould, (like fibres of cotton,) and these, so far as could be found by examination, were only on and near the top, as if the vapor passing from the bulk in drying, had there condensed (by meeting the colder air) and settled. The other older pens were slightly examined into, and seemed to be in good state—and also the fourth, which had been later filled to the height of four feet only, and with corn less wet. Foggy, and generally cloudy, but some sunshine.

26th. Observed that the corn, (as shucked,) had a little white mould between the grains of many ears—as I supposed, from trial, at least of one ear in every ten of those as large and ripe as any. This too was from the last gathered of the day before, not rained on since, and was as much affected, as any, on the surface of the heap. Of course this effect could not have been produced *after* gathering—and must have been caused merely by the damp weather; and it had probably so affected all the standing corn in my field, and in every other. There was so little mouldiness that it was barely perceptible. It would probably have disappeared in a few dry and cold days—but might spread and become generally injurious in damp and confined air, as was in my barn, notwithstanding the circulation from doors and windows throughout every day—and through some upper windows throughout the night also.

27th. Cloudy, and threatening rain, until 8 A. M. —afterwards, sunshine and very warm. The greenest ears (having the shuck quite green,) had been laid thin on a floor of rails. These were shucked this day, and found to be in good order—sound, and the curing so advanced, that the grain was out of danger.

28th. Sunday—raining incessantly for 16 hours. The heap of corn hauled in the day before, and not shucked, exposed to the weather.

29th. Pulled down one of the divisions of the second pen, 5½ feet deep, and containing 13 to 14 barrels of grain. Picked out carefully every damaged, or too green ear. These made not quite two bushels of ears and ends of ears (broken off) partly rotten, and eight bushels of ears which had been too green for penning, and were still damp, or a little touched with mouldiness, rot, or sprouting. Some sprouts were 1½ inches long. The good corn put into another pen. Cool.

30th. Clear and cool. The corn gathered and hauled up this day was the only parcel from the beginning which could be called free from the wet of rain—and except the part shucked and housed on the 26th, all the balance (about 180 barrels of grain) had been in rain either in the field after being gathered, or at the barn door, before being shucked.

Oct. 1st. Cloudy and threatening to rain, and several light scuds of but a few minutes duration. Very warm through the afternoon. About 4 o'clock, P. M. I discovered that the corn in the first four filled pens, was quite wet, as if in a general sweat—and the same of all in the garret, lying 2½ feet thick over an open floor of rails. Supposed all the balance in the house equally in danger, but had no time then to examine further. Began immediately to pull down the first, third, and half of the fourth pen, and the corn (about 80 barrels) was carried out and spread thin on the ground by 8 o'clock. Rain then threatening, or the work would have been continued longer. In feeling the ears, for examination, my hands were soon made quite wet. Was told that the looking glasses and varnished furniture in my dwelling house had been observed to be as wet as I found the corn. At 8 P. M. the thermometer was at 75 degrees. A slight scud of rain only in the night.

2nd. Proceeded in the morning to empty the remaining pens, but soon stopped, as it appeared that the external moisture of the corn had passed off. The threatening of rain (and which came before night,) compelled the exposed corn to be brought in, and again penned, by noon. About four barrels were left out as touched with mould, rot, or as still too soft and sappy. Perhaps not one barrel of this, if separated by grains, would be considered actually rotten, or greatly damaged.

3rd. Still warm. Return to gathering, shucking and penning, under the shed which covered the horse-power of my thrashing machine. Two pens were finished here by the 8th, and of these only, all the corn kept well.

4th. Threatening rain—which fell heavily at night.
5th. Clear and cold weather. 6th and 7th, clear.
8th. Cloudy, and drizzle for some hours.

Here ends my daily record for that year. The other pens in the house were emptied about this time, and the damaged corn separated, and by such means, the further progress of rotting was stopped.

What was the amount of loss I could not ascertain, as the damaged corn was used for feeding the horses and hogs during the whole time. My overseer reported, as his opinion, that the corn either rotted or greatly damaged, did not exceed 15 barrels, out of near 400 penned in all, before my wheat sowing commenced. But I had little reason to trust to his accuracy, and would therefore guess that double that amount or more would be nearer the truth

It may appear as the height of folly to have continued to gather corn in the intervals of such a succession of rains. But each rain was supposed to be the last of the wet spell—and whatever loss there might have been incurred from bad weather and bad management in the corn, already gathered, none was anticipated in what was to be gathered at a later time. My previous experiments had been so successful, and a single heavy rain on the corn had been found to be so harmless, that I was rendered foolishly confident. But let it be remembered, that even the ordinary mode of harvesting, corn is not always safe—and that of the crop of 1816, and the last (1835,) many experienced farmers committed as great errors, and lost much more corn and labor, than I did by this novel plan, in this strange and unlucky season.

Experiment of 1835.

On the next crop I would only hazard the experiment of one pen. The corn for this was begun to be gathered on September 21st. No fodder or tops had been taken from the corn, which made the grain less dry than it would otherwise have been. The pen was built under the machine shed, and raised on sills a foot from the ground. The first gathered piece of corn (3 acres) filled it about four feet. Over this, was laid a covering of rails (lying close to the corn) to separate it from the next gathering. On the 25th the filling of the pen proceeded, from another piece of land. Here the blade fodder had been pulled, but the tops not cut off. The corn here was dryer than the first. The pen was filled 12 feet high, inside measure. The lower part, five to six feet high, was open to the wind, but the upper part sheltered from its free passage by the surrounding roof of the shed. All seemed safe. We began to use the corn for bread, and horse food, early in November. The top was dry enough and sound—and so was the bottom and first gathering: but the middle, above the free opening to the air had many mouldy ears.

It should be remembered (as before stated,) that of this year's crop, like that of the cold year 1816, many farmers have had large quantities of corn to mould or rot, both in the shocks, and in cribs, as managed and harvested in the usual manner. This proves that the last season was very unfavorable to the maturing or drying of corn—and that fact should be considered in passing judgement on my last experiment.

In 1816, after some very cold weather late in December, I discovered that my whole crop of corn was beginning to mould—and except for so much as I could place thin on the floors of several houses, I was compelled to spread all on the ground, exposed for some days and nights to whatever weather might chance to come. Fortunately there was no rain, and all the crop by this airing, was saved in good order, except 40 barrels, picked out previously, as more or less injured by mouldiness. The recollection of this loss alone saved me from its repetition in the crop of last year, (1835)—and very many farmers, in both these years, suffered still more than I did in 1816, or by my trial of early gathering in 1834. Yet no farmer will thence infer, and act in accordance, that it is always unsafe and improper to follow the usual mode of shocking corn in October, and of putting it in houses in November. The proper inference is, that no mode of harvesting any kind of crop is safe in all seasons—and that care, and the proper exercise of judgement, are always necessary.

E. R.

Jan. 26, 1836.

From the Richmond Enquirer.

"The Regie of France have declared an adjudication, or contract, for delivery in samples, to be shown in Paris, in Nov. next, for 3,000 hhds. Maryland, 3,000 Kentucky, and about 3,500 to 4,000 Virginia—not confined to fine qualities, but to range middling, good, and fine, in consequence of a declared purpose of discontinuing the growth of tobacco in France. The deliveries to be made through the spring and summer of 1836.

"This proposal of discontinuing the culture of tobacco in France, is an important feature; but its effects will not be materially felt for another year."

For the Farmers' Register.

COMMERCIAL REPORT.

The commercial transactions of the present and preceding month, have been attended with no remarkable variations. The most important articles of foreign and domestic produce have commanded good prices, but none have been borne up unwarrantably by speculation.

Although it is the prevailing opinion that the crop of cotton in the United States will prove fifty to one hundred thousand bales larger than the previous one, yet with the exception of South Carolina and Georgia, the quantity brought to market is much less than at the same period last year. This is ascribed to an opinion entertained by the planters, that they will obtain better prices at a later period in the season; and the moderate supply has doubtless tended to support prices at higher rates than foreign quotations would seem to warrant. In New Orleans, 13½ to 18 cents—average lots 15 cents. In Mobile, 13½ to 16½ cents. In the Atlantic markets, generally 13 to 15 cents, except for very fine quality. The prices in England continued, until last month, when they became steady, at such low rates, compared with those previously current, as to cause heavy losses on shipments from this country. There is no doubt that the consumption of cotton continues to

increase—but the production bids fair to overtake it, as they are now nearly on a par.

Prices of tobacco are well sustained in this country, and generally in Europe. Of that which has been brought to market this season, a large portion is frostbitten, and otherwise of inferior quality; but the better sorts do not usually appear until later in the season—$6 to $10, embrace all but the extreme prices. The manufacturers are actively employed in replacing the quantities which were destroyed by the great fire in New York; estimated at about 10,000 kegs and boxes.

Flour has been rather dull for some weeks past, and may be quoted at $6¾ to 7. Although the stock in the United States is estimated to be unusually small, yet as the home demand is the only important one, the expectation of high prices seems to be abandoned. Wheat commands 130 to 135 cents.

Contrary to the impression which prevailed a few months ago, that corn would be very low, it bears a good price—and a fair demand exists on James river (tide water,) at $3.35 per. barrel, or 67 cents per bushel. The product was much diminished by damage sustained in the moist and warm weather during the season for curing.

The uncertainty as to the termination of our differences with France, which appear to us on a point of etiquette, is the cause of considerable anxiety, and creates a want of confidence in commercial operations.

The destructive fire which occurred in New York on the 16th of December, consuming between 500 and 600 stores, and property estimated at more than seventeen millions of dollars, would, it was apprehended, have caused a great number of failures among the merchants there, and even elsewhere; but happily no such consequences have followed—although the insurance offices generally, have as yet been unable to pay their losses, and many of them are rendered insolvent—and no relief has as yet been granted by the government. A higher encomium could not be passed on the mercantile community, than the fact that the members of it, should thus have sustained themselves, and each other, under such an unprecedented calamity.

At this season of legislation, efforts are making in many of the states for a great increase of banking capital—the aggregate exceeding probably, one hundred millions of dollars. The charter of the United States Bank will expire in March next; but an impression now prevails that the state of Pennsylvania will grant a new charter. Should its command of capital as a state institution enable it to check excessive issues by minor establishments, and should its power be used as heretofore, to that end, it may prevent a recurrence of the state of things which existed at the time of its creation, and which in fact, was the chief inducement for founding it. A London banker has, it is stated, established an agency in Boston.

It is a subject of congratulation, that our brethren of North Carolina, with whom our commercial ties are so interesting and important, are about to open a channel of communication, by which the intercourse between that state and all those north of it, will be greatly facilitated. The charter for a rail road from Raleigh to Gaston, (Wilkin's Ferry,) on Roanoke, was no sooner granted, than the citizens of Raleigh, acting in a most liberal spirit, in conjunction with those of Petersburg, at once secured the privileges of the charter and the certainty of effecting the work, by an equal subscription from each place, amounting to $300,000, even in anticipation of the opening of the books. This sum is now receiving considerable accession in those two places—about $400,0000 having been already subscribed in them; and as a liberal spirit now prevails among the citizens of North Carolina generally, it will doubtless be displayed by extensive subscriptions in the various towns where books are opened.

The intimate connexion of this work with the rail road now in progress from Richmond to Fredericksburg, and others north of it, which will constitute an uninterrupted line north and south, must induce those who are interested in the success of any one work, to give a helping hand to this, from which they are to derive such obvious advantages. The commercial interests of Petersburg and Richmond are deeply involved in its success; and it is presumed the citizens of the latter place, will evince their readiness to promote this important object by a liberal contribution towards it—particularly as it holds out as fair a prospect of ample remuneration for capital invested, as any similar work. Another link south of Raleigh will complete the great chain. Many other works of internal improvement are in progress, or projected, in various parts of the state.

The manufacturing establishments in Virginia, particularly of cotton, are thriving, and the number of them increasing: the quantity of raw material thus consumed at home, has an evident influence on the price, which, during the season, has usually been as high in Petersburg as in New York—for equal quality.

X.

January 28, 1836.

TO READERS AND CORRESPONDENTS.

The communications of our friends come very irregularly, and during the last month, in but small number. Our January No. was unusually rich in original communications, and this contains very few. We hope that correspondents, both new and old, will hasten to prevent a continuance of such a complaint. Some of those who have recently favored us with *communications*, have sent them *post paid*. This is not desired—and we are unwilling that this additional tax should be imposed on those to whose communications we are indebted for the principal value which this journal possesses.

AGENCIES AND COLLECTIONS.

James Anderson is no longer an agent for this publication. Robert Hill of King William, and his assistants N. B. Hill and Edw. N. Dabney, are the only persons authorized to collect subscriptions due to the Farmers' Register.

Subscriptions may be paid at the bookstore of Campbell and Ruffin, Petersburg, or to the Editor by mail, and at his risk, as heretofore, if the payment is certified by the postmaster at whose office it is mailed.

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